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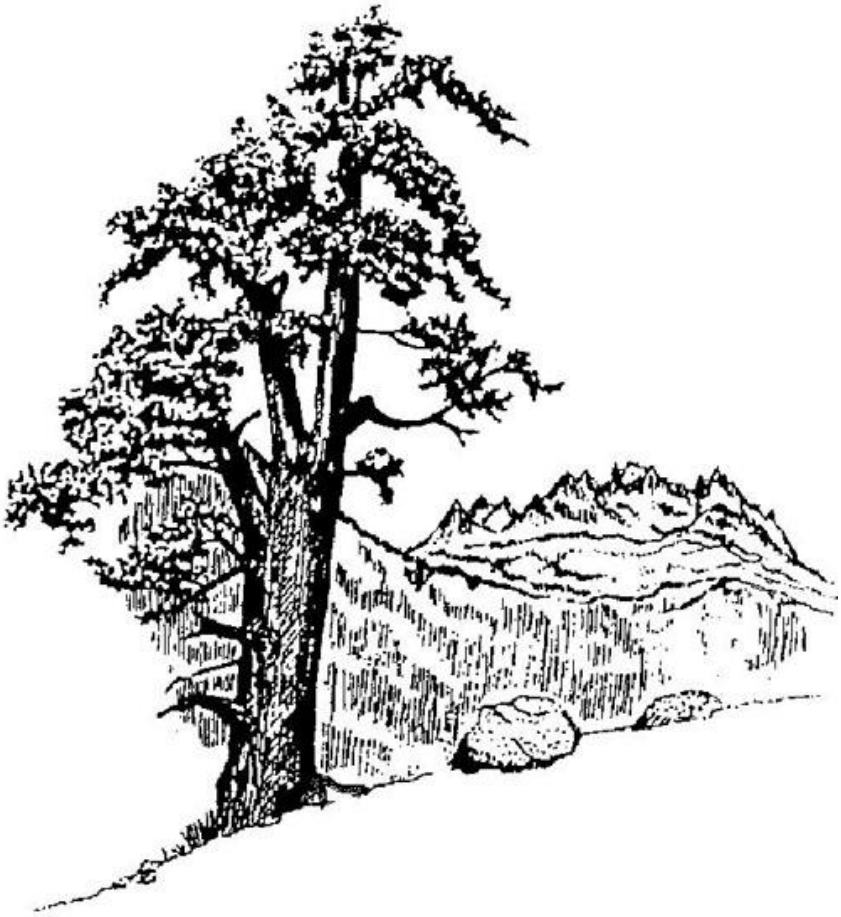
Final Environmental Impact Statement

Record of Decision

Sierra National Forest
Fish Camp Project



Sierra National Forest
Fish Camp Project

Record of Decision

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Abstract: A Final Environmental Impact Statement (FEIS) analyzing alternatives for the Fish Camp Project (Project) on the Sierra National Forest is available for public review in the Bass Lake Ranger District Office. This Record of Decision documents the Deciding Officer's decision pertaining to the alternatives identified in the FEIS.

This FEIS analyzes the effects of two action alternatives designed to restore fire-adapted forests and create resilient, healthy forests. A no action alternative was also analyzed. The Project encompasses 5,440 acres immediately east of the community of Fish Camp and borders Yosemite National Park.

The decision (1) allows strategically place area treatments on the landscape designed to reduce the intensity and spread of wildfires across the landscape and near communities; (2) allows treatments to reduce stand densities to provide for increased stand resiliency, growth and vigor; and (3) implements these treatments in such a way as to maintain adequate habitat elements for at-risk species.

Introduction

This Record of Decision (ROD) documents my decision on the Fish Camp Project on the Sierra National Forest (SNF or Forest). The purpose of this project is multifaceted and includes:

- Strategically placing area treatments [known in the Sierra Nevada Forest Plan Amendment (SNFPA, ROD, USDA-FS, 2004) as SPLATs] on the landscape to reduce the intensity and spread of wildfires across the landscape and near communities and;
- Reducing inter-tree competition (stand density) to improve tree vigor and tree growth whereby providing increased stand resiliency to drought conditions, insect and disease attack and wildfire effects.

As this project is located in the Southern Sierra Fisher Conservation Area land allocation (2004 Sierra Nevada Forest Plan Amendment ROD (SNFPA 2004 ROD)), the Forest was mindful of the goal of retaining and maintaining fisher habitat and the desired condition canopy cover goals in female fisher home ranges. Effort was made to design the Project to meet the above purposes as well as the land management guidance.

Background

The Sierra National Forest Land and Resource Management Plan (SNF LRMP) was amended in 2001 by the SNFPA Record of Decision (ROD) (USDA-FS 1992, 2001b). In the 2001 SNFPA ROD Standards and Guidelines (S&Gs) for project planning were to focus on the modification of fire behavior through fuels treatments. These treatments were to have the highest priority in areas described as Wildland Urban Interface/Intermix (WUI). In 2004, a Supplemental EIS (USDA-2004a) was written to the SNFPA and a new ROD was signed (USDA-FS 2004b). This SNFPA 2004 ROD replaced the 2001 decision in its entirety. This decision recommended an ecosystem approach whereby the development and planning of projects would not only be based on fuels reduction treatments, but would create an overall approach by looking at all key elements within an ecosystem; however, WUI continued to be the highest priority area for treatments.

Location

The project is located on the SNF in Madera and Mariposa Counties, California (See Vicinity Map, Figure 1). The project area includes SNF System lands within the Bass Lake Ranger District of the SNF and includes portions of Township (T) 5 South(S), Range (R) 21 East (E), sections 8, 14, 15, 23-26, 35 and 36; T.5.S, R.22.E, sections 1-4, 9-36; and T.5.S, R.23.E sections 3-10, 14-22, 29 and 30 Mount Diablo Base and Meridian.

Figure 1-Vicinity Map

Purpose and Need

The Forest Service (FS) is currently directing land management activities towards forest health restoration through intentional activities that initiate or accelerate the recovery of an ecosystem with respect to its health, integrity and sustainability. Restoration focuses on establishing the composition, structure, pattern, hydrologic function and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient, and healthy under current and future conditions (Forest Service Manual (FSM) 2010).

The underlying needs for this decision include:

1. Reduction in the surface and ladder fuels, that protects human communities from moderate/high intensity wildfires as well as minimizes the spread of wildfires that might originate in urban areas into the forested lands. The reasons for this need are to increase the efficiency of firefighting efforts and reduce risks to firefighters, the public, facilities and structures, and natural resources from moderate/high intensity wild fires.
2. Resilience of conifer stands to attack from insects, diseases, drought conditions, and/or wildfire. The reason for this need is conifer stands are well above normal stocking levels (stand densities) resulting in a decline in growth, health and resiliency, thus increasing a stands potential for higher rates of mortality.

In meeting the aforementioned needs the action must also achieve the following purposes:

1. Reduction in the intensity and spread of wildfires across the landscape and near communities. The reason for this purpose is to provide a buffer between developed areas and wildlands where fire suppression capabilities are enhanced by modified fire behavior inside the WUI zones as well as provide a safe and effective area for fire suppression activities to occur (USDA-FS 2001, page 9).
2. Reduction in stand density within the lower and mid-canopy layers of conifer stands, to provide for increased stand resiliency, growth and vigor. The reason for this purpose is to increase the capability for forested stands to withstand drought conditions, attacks from insects and diseases, and the effects from wildfire.

Decision

Based on the analysis of the purpose and need for action, the issues, the LRMP as amended and, current policies and regulations, the analysis of alternatives contained in the FEIS, public comments received, and other information in the project record, I have decided to implement Alternative 2 which was the Proposed Action in the FEIS. Alternative 2 includes the following actions within the Project area:

Action	Alternative 2 – Proposed Action
Commercially thin mixed conifer, pine, and white fir stands	**approximately 562 acres**
Commercially thin ponderosa and Jeffrey pine plantations	**approximately 404 acres**
Pre-commercially thin by mastication	**approximately *41* acres of plantations**
Plant and hand release treated openings	**approximately *10* acres**
Underburn	**approximately up to 193 acres within 7 prescribed fire units**
Underburn	**portions of T units 8, 9, 10, and 12 approximately 208 acres**
Road maintenance	**approximately 41.9 miles of forest system roads**
Road reconstruction	**approximately 12.9 miles of forest system roads**
Temporary road construction	**0.5 miles**
Commercial stand slash treatment	**combination of tractor or hand piling and burning or mastication of all T* units**
Noxious weeds as identified in document	**manually pull and/or prescribed burn**
Leave land untreated	**approximately 4,240 acres**

Note: * For the purposes of this document the designation of "T" unit is for all units that will have tractor use within them. The designation of Rx designates units which will be treated with prescribed fire.

See ROD Appendix A for a detailed description of my decision which can also be found in Chapter 2 of the FEIS. Part of my decision includes the implementation of design criteria found in ROD Appendix B (as well as in the FEIS Chapter 2). These design criteria contain, among other resource protection actions, important actions designed to address fisher habitat that include:

- retention of large tree elements,
- clumpy, irregular treatments,
- retention of high canopy cover in female fisher home ranges, and
- retention of downed woody debris (SNFPA 2004 ROD p. 41 & 47).

My decision also includes the implementation of the BMP and Monitoring Plan described in ROD Appendix C & D respectively. To clarify my decision, ROD Appendix E includes a stand by stand description of the treatments included as part of my decision. The Project treatments are strategically placed on the landscape (SPLATs) to reduce the intensity and spread of wildfire. A treatment area map displaying this strategic placement can be found in ROD Appendix F. ROD Appendix G includes a table showing the prescription and resulting canopy cover for the implementation of Alternative 2.

Commercial Thinning:

Described below are the target residual stocking levels for treatment units within the Fish Camp Project. For a given basal area, more trees per acre are retained in the residual stand in areas with smaller diameter trees than in areas of larger trees. The silvicultural prescriptions for ponderosa pine (plantations included), mixed conifer and white fir will be described utilizing basal area per acre.

My decision would commercially thin wild stands on slopes generally less than 35 percent outside of Protected Activity Centers, and Old Forest Linkages to stocking levels that, with current growth, would result in returning stands to 80 percent of normal basal area stocking 15 to 20 years following harvesting. Canopy cover that meets or exceeds those directed under the Sierra Nevada Framework will be retained following treatment. The target condition for general stocking levels for Alternatives 2 is:

- Basal area following thinning—ponderosa pine/plantations—135 ft^2 per acre (45% normal)
- Basal area following thinning—mixed conifer—210 ft^2 per acre (60% normal)
- Basal area following thinning—white fir—240 ft^2 per acre (60% normal)

Stands in the Forest with special circumstances will have target basal areas that deviate from the above general prescription. A basal area of 150 ft^2 will be achieved in locations where leave trees have full crowns. A basal are of 180 ft^2 per acre will be achieved in areas with poorer crown leave trees, higher growing sites, older trees and in Home Range Core Areas.

The portions of the 40 to 50 year old pine plantations that are planned for thinning will be thinned to basal areas of around 120 to 140 ft^2 per acre depending on existing crown condition and adjacent openings (40-45 percent of normal--26 to 30 percent SDImax).

Except where retained for wildlife purposes, suppressed, intermediate, damaged and diseased then finally codominant trees, in order of removal, would be harvested until the prescribed

stocking level has been reached. This is known as thinning from below as directed in the SNFPA 2004 ROD.

Other important commercial treatment considerations include:

- Black oaks will be retained in treated stands.
- Mechanical thinning will be limited to trees less than 30 inches diameter at breast height (dbh).

Pre-Commercial Thinning:

Hand and mastication thinning and release of natural stands/aggregations of conifers and plantation trees generally less than 10 inches dbh would be undertaken within treatment units. Depending on tree size these stands would be thinned to around 150 to 200 leave trees per acre. These thinned aggregations will occupy large and small openings. Hand thinning slash concentrations would generally be tractor piled and piles burned. Slash concentrations on steeper slopes would generally be hand piled and burned. Areas of only light slash (10-20 tons per acre) would be lop and scattered to 18 inches. Stand heterogeneity would be maintained through retention of these pre-commercially thinned clumps as well as untreated clumps on steeper slopes, the more dense clumps of larger diameter trees, SMZ's, archaeological sites, and the two to three untreated larger oaks per acre. In addition, shrub and understory diversity would be retained throughout the project area during follow-up treatments through the retention of 15-20 percent of the total understory growth in approximately 1/10th acre pockets within plantation treatment units and ¼ acre pockets within wild stand treatment units.

Prescribed Fire:

Underburning is proposed as a fuels reduction and understory management treatment within the prescribed fire stands as well as within stands T-8a&b, T-9, T-10b, T-12, and T-18a. Underburning will only be done in portions of those stands with larger, more fire resistant residual trees and fairly light slash concentrations. Where scattered heavy slash concentrations are present, some piling of slash will to be done prior to underburning. Due to the location of much of the proposed underburning, it is anticipated that late fall and early winter (after wetting rains) as well as early spring underburning may be possible. Prescribed burning of stand 55 (Rx55) consists of a recently masticated young ponderosa pine plantation. Underburning will be avoided in this young stand. In most cases, areas that have been masticated will not be underburned. The Fuels Officer and Silviculturist will field coordinate all areas to be underburned prior to undertaking underburning.

Design Criteria Included in the Decision

Based on site specific review of the project area, resource specialists identified design criteria to reduce potential impacts caused by the various alternatives. My decision includes implementation of the design criteria shown in the ROD, Appendix B. These design criteria minimize, reduce or eliminate impacts on sensitive resources.

Monitoring Included in the Decision

My decision includes the implementation of the Monitoring Plan found in Appendix D.

Best Available Science

I adopted all practicable means to avoid or minimize environmental harm in the design of this project. I included all of the project design criteria that I believe are necessary to avoid, minimize, or rectify impacts on resources affected by the implementation of this decision. My conclusions are based on a review of the record that is based on the best available science. The resource sections in Chapter 3 of the FEIS identify the effects analysis methodologies, reference scientific sources which informed the analysis, discuss responsible opposing views and disclose limitations of the analysis.

Rationale for My Decision

My decision to approve Alternative 2 is based on consideration of the purpose and need for action, the issues, the LRMP and associated amendments, current policies and regulations, the analysis of alternatives contained in the FEIS, public comments received, and other information in the project record. I considered the concerns expressed throughout this process relating to tree size and wildlife impacts. Alternative 2 is expected to substantially reduce the potential for high fire severity under all but the most extreme weather conditions, and improve forest health and resiliency.

Compelling Need for the Project

The Fish Camp Project area is overstocked with trees within all of the project area stands proposed for treatment having tree densities too high for a sustainable healthy and resilient forest. The forest density has increased in the era of fire suppression to conditions that are out of alignment with the conditions for a healthy forest. With so many trees, the forest is under stress due to over competition and will not be able to adapt and overcome stressors in the environment such as drought, insect attack, air pollution, fire and climate change which will lead to more dead trees than is desirable (FEIS Chapter 3 Silviculture Section).

Additionally the forest in its current condition is susceptible to uncharacteristic wildfire which can cause stand replacement. Fire is an important component of the forest ecosystem however the fire conditions that were in effect prior to fire suppression were typically low to the ground and of moderate intensity. Such fires would negatively impact natural resources and the public and firefighter safety. High fire severity is commonly characterized by complete mortality of the vegetation, soil damage, water pollution, ineffective suppression efforts with associated high financial costs, and loss of life and/or property (FEIS Chapter3 Fire/Fuels Section).

Many natural low-intensity fires (possibly as many as 20 based on projections from similar areas without fire suppression) would have occurred in the Project area under conditions prior to fire suppression. The lack of frequent mixed-intensity fires has caused timber stands to become overstocked with fire intolerant trees and shrubs, converting it to a fire susceptible forest type in which high intensity fires are more likely. Fire intolerant species tend to form unhealthy stands prone to uncharacteristically large and severe wildfires, drought-induced mortality, and increased outbreak of disease and insect infestation (Graham et al. 1999) (FEIS Chapter 3 Fire/Fuels and Silviculture Sections).

I understand the importance of sustaining fisher populations particularly as this project is situated within the Southern Sierra Fisher Conservation Area. I carefully considered effects on the fisher as part of my decision and balanced these with the project needs. The Forest plans and designs our management to address the conservation of that species as well as other wildlife species and other forest resources and uses. My decision may affect individual fisher but has been determined not to contribute to the need for Federal listing or result in loss of viability for fisher. The forest thinning I have decided upon retains key components important to fisher habitat including: the majority of the forest biomass including all large trees (>30 inches dbh) and nearly all moderate sized trees 20-30 inches dbh, as well as all oak trees, and all large snags unless deemed a safety hazard.

Just prior to this decision it came to my attention attention that additional fisher den sites have been located in the Project area. (Fisher denning typically occurs in April and May each year.) Information on this additional den site has been added to the FEIS. This discovery requires the implementation of the Project design criteria (explained in detail in DEIS and FEIS Chapter 2) requiring no treatments to occur within buffer acreage around these den sites. This will reduce the number of acres where forest treatment is accomplished and will somewhat reduce the ability of the Project to meet the purpose and need to the designed degree. Because we are implementing the Project as designed and described in the DEIS and FEIS the effects analysis relating to wildlife will not change. As there will be less treatment than analyzed, any adverse effects described in the analysis will be less than stated and therefore I find the current analysis sufficient to meet the requirements of NEPA and to provide me with the information I need to make an informed decision.

Additionally my decision includes extensive areas of no treatment actions (4,240 acres). Though a total of 1,200 acres were analyzed for the treatments, design criteria common to all alternatives and standards and guidelines from SNFPA 2004 ROD (USDA-FS 2004b) dictate areas where treatments cannot occur to reduce and/or eliminate adverse effects on particular resources. It is estimated that excluding these sensitive areas, (for example, cultural resource areas, botanical species areas, wildlife habitat areas, and aquatic species areas), from treatment approximately 75 percent of the project area will remain untreated. Over the short-term, there will be a relatively low level of change in California Wildlife Habitat Relationship fisher habitat types as a result of thinning treatments and an increase in total fisher habitat over the longer term. Fisher rest site groups will be identified and retained, minimum canopy cover retention levels are established and protecting and enhancing habitat heterogeneity at multiple scales will benefit fisher. Tree removal and fuels reduction activities are expected to reduce the extent, severity and intensity of wildfires within and adjacent to treated stands while maintaining existing habitat functionality (FEIS Chapter 2 and 3 Wildlife and Design Criteria Sections).

Although I acknowledge that individual sensitive species may be impacted by the project, overall the viability of sensitive species is preserved both at the project level and landscape level. The benefits to the forest in resiliency; and the benefits to the forest, the public and to worker safety from reduced fire severity outweigh the impact to these individuals in my mind. Additionally in the long run, habitat for many forest species will be enhanced as trees grow larger, large trees are more numerous, and the habitat is more heterogeneous making it a richer environment for wildlife. I am aware of the impacts to the environment and have decided that these impacts are acceptable in light of the benefits.

Alternatives Considered in Detail but Not Selected

In addition to the selected alternative, I considered two other alternatives in analyzed in detail, which are summarized below. I also have also considered four alternatives that were eliminated from detailed study:

- An alternative proposing to increase or create potential for large snags and down logs (>20" DBH) in units with little representation;
- An alternative limiting tree removal diameter to 10 inches or smaller;
- An Alternative maximizing the use of fire as the agent for achieving the project objectives; and
- An alternative limiting treatments to 200 foot zones from structures.

(For more information on these alternatives see FEIS Chapter 2.)

Alternative 1 No Action Alternative: Under the No Action alternative, current management plans would continue to guide activities in the project area.

Under the No Action alternative, current management plans would continue to guide management of the project area. No thinning, either commercial, pre-commercial and/or biomass operations, of mixed conifer and pine stands, mastication of brush/shrub patches, prescribed burning to reduce natural fuel accumulations and/or treatment of infestations of noxious weeds and replanting of conifers in failed conifer plantations would be implemented.

This alternative was not selected because it would not meet the purpose and need of this project.

Alternative 3 Non-Commercial Funding Alternative: Treatment areas would remain the same as in Alternative 2. Treatments within these areas would include only those needed to reduce the surface and ladder fuels (within the lower and limited mid-level canopy levels) to achieve fire and fuels objectives. Under Alternative 3 there would be no additional treatment (i.e. additional thinning in the mid-level canopy) to fully address stand density and forest health objectives. In conifer plantations, fire/fuels objectives are based on the need to break-up the continuity of crowns created by stands that are considered all one age (even-aged). This includes the need to remove some material that would be considered commercially sized. In treatment areas where wild stands occur (generally areas outside of plantations), the break-up of crown continuity is not the main focus, but rather meeting these objectives is based on the ability to raise the height of the canopy base (the average height of the bottom layer of branches). This requires the removal of some materials that are considered pre-commercially sized. Maintenance and/or reconstruction of forest roads that were determined to not meet Forest Service standards would be brought back up to standard. Mechanical thinning would be completed within the first two to five years of implementation. Areas where follow-up treatments are needed, such as slash piling/burning, prescribed understory burning and noxious weed treatments, would be prioritized based on proximity to WUI and completed as appropriated dollars became available.

Although Alternative 3 addresses the need for surface and ladder fuel reduction, it does not address the need for conifer stands to be resilient to attack from insects, diseases, drought conditions. Conifer stands in the project area are well above normal stocking levels (stand densities) resulting in declining growth, health and resiliency, thus increasing a stand's potential for higher rates of mortality.

Environmentally Preferable Alternative

The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves and enhances historic, cultural, and natural resources.

Based on my consideration of the factors listed above and the effects disclosed in the FEIS, I consider Alternative 2 to be the environmentally preferable alternative. I believe the management actions under Alternative 2 protect and preserve important historic, cultural, and natural resources and maintain the quality of habitat needed to protect sensitive species. Alternative 2 provides different treatment intensities depending on stand conditions over 30 percent of the landscape as well as a large amount of acreage where no treatment will occur.

Public Involvement

Involving the public in this decision and incorporating comments has been crucial to making this decision. A notice of intent to prepare an EIS was published in the Federal Register on August 12, 2010. In addition, the proposed action was listed in the SNF Schedule of Proposed Actions. In addition, on August 16, 2010, as part of the public involvement process, the Forest Service sent scoping letters to 230 environmental organizations, political representatives, tribal groups, governmental organizations and citizens with properties within 1.5 mile radius of the project boundary inviting comment and participation in a public field trip to the Project area. Seven scoping comment letters on the proposed action were received.

Issues identified from scoping comments were used to determine the scope of the analysis for the Fish Camp Project. Central to the scoping comment issues was the proper balance between forest functionality and wildfire susceptibility.

The DEIS Notice of Availability was published in the Federal Register on February 18, 2011 with the comment period ending April 4, 2011. The document was made available on the SNF website and hard copies of the document, compact disks or letters of notification were mailed to 53 interested parties.

Public Comments on the DEIS

In response to the Forest's request for comments during the DEIS comment period, Seven interested parties submitted responses. The SNF documented, analyzed, and summarized public comments. Although only substantive comments are required to be responded to in NEPA regulation, the forest chose to respond to all comments submitted. One hundred and forty seven (147) comments were responded to and these responses can be found in FEIS Appendix E. A decision was made to address all comments and/or statements received during the comment period.

Tribal Government and Native American Interests

Tribal Governments and Native American Interests representing constituents in the project area were sent all public correspondence and have consulted on aspects of the proposed projects. The following offices received mailing:

American Indian Council of Mariposa County, California Indian Basketweavers Association, Chaushilha, North Fork Mono Tribe, North Fork Mono Rancheria, Sierra Mono Museum, Southern Sierra Miwok Nation, Picayune Rancheria and the Mono Nation, a non-profit organization.

Changes between the DEIS and the FEIS

Based on both public comment and Forest Service review, changes were made between DEIS and FEIS. The following types of changes and clarifications were applied to the FEIS:

Data Omissions – In cases where omissions in data were identified by the FS or the public, those omissions were fixed in the FEIS. Where data pertinent to the analysis was identified between DEIS and FEIS it was include and analyzed.

Corrections and Edits – Where typos or errors were identified they were correct.

Clarifications – Public comment inspired the clarification of items in many sections of the FEIS. These clarifications ranged from adding a few words to help the reader more fully understand the content and rationale of a section to expansion of summary and comparison tables. The design criteria were streamlined and clarified in the FEIS as well.

Additions – Alternatives suggested by the public were addressed.

Significant Issues

Comments from the public and other agencies were used to formulate issues concerning the proposed action. No scoping comments were received from members or groups from the Native American community. Other comments received were either from the environmental community or the timber industry. The FS separated Fish Camp Project issues into two groups: significant and non-significant issues. Issues are statements of cause and effect, linking environmental effects to specific actions. Significant issues are issues with potentially significant impacts. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" Fish Camp Project significant issues were used to create design criteria and focus the effects analysis. (Please see FEIS Chapter 1 for a list of the significant issues and the associated indicators.)

Legal and Regulatory Compliance

My decision complies with the laws, policies, and executive orders listed below and described in Chapter 3 of the FEIS.

Forest Plan Consistency

My decision complies with all management direction contained in the SNF LRMP.

Findings Required by Other Laws and Regulations

The project was designed with the intent of integrating the management goals and objectives set forth in the SNF LRMP and the SNFPA 2004 ROD (Chapter 1 FEIS) while meeting the purposes and needs of the Project.

The findings for other pertinent laws associated with this decision are listed below:

1. National Environmental Policy Act (NEPA)

   NEPA requires that Federal agencies prepare detailed statements on proposed actions that significantly affect the quality of the human environment to provide decision makers with a detailed accounting of the likely environmental effects of a proposed action prior to its adoption, and to inform the public of, and allow comment on, such effects. Resource specialist have compiled and utilized information relevant to the effects of the alternatives considered in the Fish Camp Project FEIS. All substantive comments, written and oral, made on the DEIS have been summarized and responded to in Appendix E of the FEIS.

   I find that the environmental analysis and public involvement process complies with each of the major elements of the requirements set forth by the Council for Environmental Quality for implementing NEPA (40 CFR 1500-1508).

2. National Forest Management Act (NFMA)

   The National Forest Management Act (16 U.S.C. 1604) and the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531) give direction to National Forests to develop National Forest Land and Resource Management Plans that (A) ensure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish; (B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and for steps to be taken to preserve the diversity of tree species. As set forth by these Acts and the SNF LRMP, as amended, set specific S&Gs which are to be followed during project level planning and implementation. By the inclusion of design criteria as part of my decision to minimize or eliminate significant environmental effects from this project as well as the inclusion of standards and guidelines from the SNF-LRMP and SNFPA ROD as amended (USDA-FS 2004b) used to design this project, I have determined this Project complies with this Act.

3. Endangered Species Act (ESA) of 1973

   The Forest Service is directed to comply with this Act and has does so through Biological Assessments that are used to analyze the effects of the proposed alternatives. These assessments and evaluations make determinations on Federally-listed endangered, threatened, candidate and proposed species and their habitat. The analysis was conducted in part to determine whether formal consultation or conference is required with the United States Department of the Interior, Fish and Wildlife Service, pursuant to this Act.

   My decision, through the inclusion of design criteria for species covered under this Act, inconsideration of the analysis and determinations contained in Biological Assessments and Evaluations for Botanical (J. Clines 2010), Aquatic Wildlife (P. Strand 2010), and Terrestrial Wildlife (A. Otto/G. Schroer/K. Williams 2010) species, is in compliance with the ESA. Additionally as there are no federally threatened or endangered botanical, terrestrial wildlife or aquatic species potentially affected by the project, I find the project is in full compliance with the ESA (FEIS Chapter 3 Terrestrial, Botanical and Aquatics Sections).

4. Clean Water Act (CWA)

   The Clean Water Act delegates authority for management of water quality to the states, and waives sovereign immunity for state and local laws pertaining to water-quality protection. Compliance with the federal CWA is primarily through the California Porter-Cologne Act as administered by the Central Valley Regional Water Quality Control Board Basin Plans and implementation of Best Management Practices (FEIS Chapter 3, FEIS Appendix B and ROD Appendix C). The Water Resources analysis concluded that my decision complies with the CWA through implementation of the design criteria and BMPs (FEIS Chapter 3 Hydrology Section).

5. Clean Air Act of 1970 (CAA)

   The CAA provides for the protection and enhancement of the nation's air resources. Under the General Conformity Rule my decision has been determined to comply with this Act and the California State Implementation Plan through the implementation of treatments following Best Available Control Measures) for prescribed burning as well as rules and regulations established by the San Joaquin Valley Air Pollution Control District and Mountain Counties Air Pollution Control District as required under section 190 of this Act, as amended in 1990. No exceedance of the federal and state ambient air quality standards is expected to result from any of the alternatives (FEIS Chapter 3 Air Quality Section). For these reasons I find that this Project complies with the CAA.

6. National Historic Preservation Act (NHPA) of 1966

   Section 106 requires federal agencies to consider the potential effects of a Preferred Alternative on historic, architectural, or archaeological resources that are eligible for inclusion on the National Register of Historic Places and to afford the President's Advisory Council on Historic Preservation an opportunity to comment. Section 110 requires federal agencies to identify, evaluate, inventory, and protect National Register of Historic Places resources on properties they control. Potential impacts to archaeological and historic resources were evaluated in compliance with Section 106.

   In accordance with the Regional Programmatic Agreement (PA), a cultural resource identification effort was conducted of the Area of Potential Effect by a professional archaeologist. The goal was to identify cultural resources at risk of adverse effects from the proposed actions. No direct effects to cultural resources with archaeological values are anticipated from implementation of my decision. Specific protection and management measures derived from the PA would be applied to archaeological sites as project design measures (FEIS Chapter 2). All National Register eligible and potentially eligible properties would be managed for no effect (per the PA) from project activities (FEIS Chapter 2).

   Cultural resource design criteria are established for all action alternatives and are based on stipulations within the PA. Because of the design criteria and the Project's compliance with the PA, I find my decision would be in compliance with historic preservation law, policy and regulation (FEIS Chapter 3 Cultural Resources Section).

Administrative Review or Appeal Opportunities

This decision is subject to appeal pursuant to 36 CFR 215. In accordance with the April 24, 2006 order issued by the U. S. District Court for the Missoula Division of the District of Montana in Case No. CV 03-119-M-DWM, only those individuals and organizations who provided

comments during the comment period are eligible to appeal [36 CFR 215.11(a), 1993 version]. Appeals must be filed within 45 days from the publication date of the legal notice in the *Fresno Bee*. Notices of appeal must meet the specific content requirements of 36 CFR 215.14. An appeal, including attachments, must be filed (regular mail, fax, e-mail, hand-delivery, express delivery, or messenger service) with the appropriate Appeal Deciding Officer [36 CFR 215.8] within 45 days following the publication date of the legal notice. The publication date of the legal notice is the exclusive means for calculating the time period to file an appeal [36 CFR 215.15 (a)]. Those wishing to appeal should not rely upon dates or timeframe information provided by any other source.

Appeals must be submitted to Regional Forester, USDA Forest Service, 1323 Club Drive, Vallejo, CA 94592, (707) 562-8737. Appeals may be submitted by FAX [(707) 562-9091] or by hand-delivery to the Regional Office, at the address shown above, during normal business hours (Monday-Friday 8:00am to 4:00pm). Electronic appeals, in acceptable [plain text (.txt), rich text (.rtf) or Word (.doc)] formats, may be submitted to appeals-pacificsouthwest-regional-office@fs.fed.us with Subject: Fish Camp Project.

For electronically mailed appeals, the sender should normally receive an automated electronic acknowledgment from the agency as confirmation of receipt. If the sender does not receive an automated acknowledgment of the receipt of the appeal, it is the sender's responsibility to ensure timely receipt by other means [36 CFR 215.6(a)(4)(iii)].

Implementation Date

If no appeals are filed within the 45 day appeal period, implementation of the decision may occur on, but not before, 5 business days from the close of the appeal filing period. When appeals are filed, implementation may occur on, but not before, the 15th business day following the date of the last appeal disposition.

Contact Person

The FEIS and supporting documents are available for public review at the Sierra National Forest, Bass Lake Ranger District, 57003 Road 225, North Fork, CA 93643, (559) 877-2218. For further information on this decision, contact Mark Lemon (mlemon@fs.fed.us), Interdisciplinary Team Leader at (559) 877-2218 extension 3110.

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Scott G. Armentrout Date

Forest Supervisor, Sierra National Forest

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Appendix A

Alternative 2 – The Proposed Action

Treatment areas within the project area boundary were delineated to include those areas where some form of treatment was necessary to protect communities from wildfire and to improve forest health and resiliency. In developing the proposed action, first treatment areas were designed to create SPLATs to reduce the intensity and spread of wildfires in and around WUI. Treatment areas near key transportation corridors and within the defense zone of the WUI were designed next. Treatment areas were further designed to not only focus on those treatments needed to meet fire and fuel objectives (treatments defined for fire/fuels are designed to reduce the ladder and surface fuels and occur within the lower and limited mid-level canopy [Fire/Fuels Objectives]), but areas where the stands were considered overstocked with conifers and are vulnerable to loss from insect, disease and wildfire (Forest Health Objectives).

Treatments defined for forest health are designed to reduce basal area and stocking to such a level that the stands are resilient to changing environmental conditions, increase growth and are vigorous with reduced susceptibility to insect and disease attack and wildfire. These treatments occur within the lower and mid-level canopy.

Maintenance and/or reconstruction of forest roads that were determined to not meet Forest Service standards will be brought back up to standard prior to commercial thinning. Commercial thinning would be completed within the first two to five years of implementation. Areas where follow-up treatments are needed, such as slash piling/burning, prescribed understory burning and noxious weed treatments, would be prioritized based on proximity to WUI and completed as appropriated dollars became available. The Design Criteria are incorporated as part of this decision and can be found in Appendix B. A treatment area map can be found in Appendix E.

Of the 5,440 total acres within the project boundary, approximately 1,200 acres will have some form(s) of treatment (so named as treatment areas). The remaining 4,240 acres have no treatments proposed due to slopes greater than 35 percent, standard and guideline limitations on treatment and/or no treatment is needed to meet the purpose and need.

In Alternative 2 (Proposed Action) the treatments include:

- commercially thin mixed conifer, pine, and white fir stands on approximately 562 acres;
- commercially thin ponderosa and Jeffrey pine plantations on approximately 404 acres;
- pre-commercially thin by masticating approximately *41* acres of plantations;
- plant and hand release treated openings within commercial thin and mastication treatment areas on up to *10* acres;
- treat slash concentrations within commercially thinned stands by a combination of tractor or hand piling and burning or mastication;
- underburn on approximately up to 193 acres within 7 prescribed fire stands;
- underburn within portions of T8, 9, 10, and 12 on approximately 208 acres;
- perform maintenance on approximately 41.9 miles of forest system roads;
- perform reconstruction on approximately 12.9 miles of forest system roads;

- construct 0.5 miles of temporary road ;
- manually pull and/or prescribed burn of noxious weed patches.

Though a total of 1,200 acres are analyzed for the treatments listed above, design criteria common to all alternatives and standards and guidelines from SNFPA ROD (USDA-FS 2004b) dictate areas where treatments cannot occur to reduce and/or eliminate adverse effects on particular resources. It is estimated that excluding these sensitive areas, for example, cultural resource areas, botanical species areas, wildlife habitat areas, and aquatic species areas from the treatment areas where no treatment will occur, a total of 850 – 1,000 acres will remain for treatments as proposed.

Appendix B

Design Criteria

The design criteria listed by resource area below are direction to follow during implementation. As listed, they can be directly from the SNF-LRMP (USDA-FS 1992) and SNFPA ROD (USDA-FS 2004b) Standard and Guidelines (S&G); Forest Service Manual/Handbook directions; Best Management Practices (BMP); based on past implementation experience; legal requirements; based on the best science available where they are used in addition to standards and guidelines and/or have been developed to address significant issues.

Cultural Resources

Cultural resources will be protected through implementation of Standard Protection Measures of the Regional Programmatic Agreement (PA), the primary protection measure being avoidance for all project activities, including resource design criteria. The appropriate specialist or representative will approve all landings and temporary roads prior to project implementation as needed (Appendix B of the PA).

Botany: Rare Plants and Noxious Weeds

Project design criteria for protection of Forest Service Sensitive plants include:

a) All short-leafed hulsea populations will be flagged for avoidance (SNF 1992 LRMP S&G #s 67 and 68, SNFPA 2004 ROD S&G # 125).

b) Stream reaches containing populations of the veined water lichen will be flagged for avoidance and will not be used for drafting (SNF 1992 LRMP S&Gs# 67 and 68, SNFPA 2004 ROD S&G # 125).

c) Open granitic and/or gravelly areas in or adjacent to units M08, T14a-b, T21a-d, T27, and T30 will not be driven through for project implementation nor used for parking of vehicles, heavy equipment nor used as log landings. This is to ensure protection of suitable habitat for the following sensitive plant species that have not been discovered in the project area but may exist: Mono Hot Springs evening primrose, Kelloggs' lewisia, and Yosemite bitterroot. In the event that the granitic habitat occurs within a unit, the botanist will flag suitable habitat for avoidance in coordination with timber and/or fuels staff (SNF 1992 LRMP S&Gs # 67 and 68, SNFPA 2004 ROD S&G # 125).

Project design criteria for prevention of spread of noxious weeds:

a) All heavy equipment used for implementing the project will be washed before arriving on site to remove soil and seeds of noxious weeds. This is to ensure that weed seeds or propagules are not inadvertently introduced into the project area (SNFPA 2004 ROD S&Gs # 38 and 39; USDA Forest Service FSM 2081.3, Timber Sale Contract Clause B.6.35).

b) Infestations of noxious weeds occurring in treatment units or other areas such as landings where they are likely to be spread as a result of project activities will be removed by

Forest Service personnel prior to project implementation. Because these areas will still have soil contaminated with seeds of the weeds, a buffer zone will be shown on the timber sale contract and flagged for avoidance to prevent heavy equipment from transporting seeds to other areas within the project boundary and beyond. In some cases it may be necessary to wash equipment after working in an infested unit prior to moving to a clean area elsewhere within the project boundary and/or upon exiting the project area altogether (SNFPA 2004 ROD S&Gs # 38, 40, 48; USDA Forest Service FSM 2081.3, Timber Sale Contract Clause B.6.35).

c) Any seeding, planting, or mulching for erosion control will be pre-approved by the Forest Botanist to minimize the likelihood of accidental introduction of noxious weeds and to ensure compliance with the FS Pacific Southwest Region Native Plant Policy (SNFPA 2004 ROD S&Gs # 38, 40; USDA Forest Service FSM 2081.03; R5 Native Plant Policy, 1994)

Geology/Soils

a) Leave a 100-foot wide buffer of 100 percent soil cover below large rock outcrops especially in treatment units T-06, T-10a-d, T-14a-b, T-17a-d, T-18a-d, T-21a-d, and T-28a-j. These areas have a high potential to generate run off that can cause accelerated erosion on soils down slope (FSM 2500 – Watershed and Air Management, Chapter 2550 – Soil Management).

b) Limit mechanical operations, where sustained slopes exceed 35%, except where supported by on-the-ground interdisciplinary team evaluation (SNF-LRMP S&G 125).

c) Maintain 50% soil cover over all treatment areas. Where shrub species predominate, attempt crushing before piling to create small woody fragments left scattered over the site for soil cover and erosion protection (SNF-LRMP S&G #130).

d) Maintain at least five well-distributed logs per acre as large woody debris (LWD) representing the range of decomposition classes defined in the (SNFPA ROD S&G 10).

e) Provide for road surface stabilization (gravel) on roads over 5% grade that are located on sensitive soils, including Ultic Haploxeralf soils (SNF- LRMP S&G #129) and are affecting soil productivity and/or water quality.

Lands/Special Uses

1. Forest Service project managers will notify permit holders and agencies, in person or in writing, project activities including mastication, pre-commercial thinning and/or understory prescribed fire will be implemented in Forest areas that may affect their authorized special uses or agency jurisdictions. A list of permit holders is located in the project record. Forest Service managers responsible for implementation will work with permit holders to ensure authorized improvements and/or right-of-ways are clearly identified on all contracts and visible during project implementation. Appropriate protection measures will be put in place.

Recreation and Recreation Special Uses

a) From Memorial Day Weekend to Labor Day weekend, no logging or log haul will be permitted within ¼ mile of Big Sandy Campground from 6 PM Friday to 10 PM Sunday (10PM Monday for July 4) on all weekends.

b) From Memorial Day Weekend to Labor Day weekend, no logging or log haul will be permitted within ¼ mile of Goat Meadow Snow Play Area from 6 PM Friday to 10 PM Sunday (10PM Monday for July 4) on all weekends to prevent interference with summer recreational activities.

c) The parking area at Goat Meadow Snow Play Area will not be used for a landing or staging area for project related equipment and will be fully accessible to the public on weekends.

d) All activity fuels and slash will be pulled out of and at least 5 feet away from established Forest Service or permittee trails and any damage by project activities will be repaired to pre-project conditions within 7 days of completion of logging adjacent to affected trails.

e) From Memorial Day weekend through Labor Day weekend, no logging will be permitted within ¼ mile of the YTPS base facility or inside units T-7a, T-10a, T-10b, T-18a and T-18b adjacent to YTPS trails.

Wildlife – Terrestrial

Many standards and guidelines address wildlife and the Project includes compliance with them all however for brevity's sake those that are particularly important for managing wildlife and wildlife habitat and/or have sparked public interest related to the Fish Camp Project area are listed here.

Down Woody Material: "Determine down woody material retention levels on an individual project basis, based on desired conditions. Emphasize retention of wood in the largest size classes and in decay classes 1, 2, and 3. Consider the effects of follow-up prescribed fire in achieving desired down woody material retention levels." This will be met by maintaining at least five well-distributed logs per acre as large woody debris (LWD) representing the range of decomposition classes from the Geology/Soils design criteria throughout the implementation of this project. (SNFPA ROD S&G#10)

Snag Retention: "Design projects to implement and sustain a generally continuous supply of snags and live decadent trees suitable for cavity nesting wildlife across a landscape. Retain some mid- and large-diameter live trees that are currently in decline, have substantial wood defect, or that have desirable characteristics (teakettle branches, large diameter broken top, large cavities in the bole) to serve as future replacement snags and to provide nesting structure. When determining snag retention levels and locations, consider land allocation, desired condition, landscape position, potential prescribed burning and fire suppression line locations, and site conditions (such as riparian areas and ridge tops) avoiding uniformity across large areas.

The general guidelines for large-snag retention are as follows:

- Westside mixed conifer and ponderosa pine types – four of the largest snags per acre.
- Use snags larger than 15 inches dbh to meet this guideline. Snags should be clumped and distributed irregularly across the treatment units. Consider leaving fewer snags

strategically located in treatment areas within the WUI. When some snags are expected to be lost due to hazard removal or the effects of prescribed fire, consider these potential losses during project planning to achieve desired snag retention levels." (SNFPA ROD S&G#11)

Old Forest Associated Species: Assess the potential impact of projects on the connectivity of habitat for old forest associated species. **(**SNFPA ROD S&G #28**)**

Forested Linkages: Consider retaining forested linkages (with canopy cover greater than 40 percent) that are interconnected via riparian areas and ridgetop saddles during project-level analysis. **(**SNFPA ROD S&G #29**)**

Limited Operating Period for Spotted Owls and Northern Goshawks: Should surveys locate activity centers or active nests for California spotted owls or Northern goshawks, LOPs restricting vegetation treatments during the LOP period will be applied within a ¼ mile radius of the activity center or nest. Should a great gray owl nest be located, the nesting location will be protected by an LOP. The district biologist will be notified when a nest or den of any Threatened (T), Endangered (E) Candidate (C), Proposed (P), or Forest Service Sensitive (FSS) species are discovered within or adjacent to a treatment area and an LOP would be established. All areas within the project area have been surveyed to regional protocol for California spotted owl and Northern goshawk. **(**SNFPA ROD S&G #75&76)

Limited Operating Period for Fisher Den Sites (SNFPA ROD S&G #85**):** Protect fisher den site buffers from disturbance with a limited operating period (LOP) from March 1 through June 30 for vegetation treatments as long as habitat remains suitable or until another Regionally-approved management strategy is implemented. The LOP may be waived for individual projects of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location. **(**SNFPA ROD S&G #85**)**

Fisher Den Site Management: Avoid fuel treatments in fisher den site buffers to the extent possible. If areas within den site buffers must be treated to achieve fuels objectives for the urban wildland intermix zone, limit treatments to mechanical clearing of fuels. Treat ladder and surface fuels to achieve fuels objectives. Use piling or mastication to treat surface fuels during initial treatment. Burning of pile debris is allowed. Prescribed fire may be used to treat fuels if no other reasonable alternative exists. **(**SNFPA ROD S&G #86)

Management in Southern Sierra Fisher Conservation Area: Prior to vegetation treatments, design measures to protect important habitat structures as identified by the wildlife biologist, such as large diameter snags and oaks, patches of dense large trees typically ¼ to 2 acres, large trees with cavities for nesting, clumps of small understory trees, and coarse woody material. For example, use firing patterns, place lines around snags and large logs, and implement other prescribed burning techniques to minimize effects to these attributes. Use mechanical treatments when appropriate to minimize effects on preferred fisher habitat elements. **(**SNFPA ROD S&G #90**)**

Pacific Fisher Den Site Buffers: The SNFPA ROD 2004 (USDA-FS 2004b) requires a minimum 700-acre buffer around fisher birthing and kit rearing dens, and this buffer consists of the best quality and most contiguous habitat. Standards and guidelines for management actions

within these buffers are: #85 (creation of an LOP during breeding and rearing season); #86 (mechanical treatment of surface and ladder fuels only, if den site within WUI); and #87 (mitigation of disturbance by recreational users).

Southern Sierra Fisher Conservation Area Desired Conditions: Within known or estimated female fisher home ranges outside the Wildfire Urban Interface Zone (WUI), a minimum of 50 percent of the forested area has at least 60 percent canopy cover. The entire project area is within the Southern Sierra Fisher Conservation Area (SSFCA), and there are approximately 2230 acres of WUI within the Fish Camp project boundary. (SNFPA ROD, pg. 41)

The following management actions which expand upon the S&Gs in the LRMP will help maintain and/or enhance important Pacific fisher and American marten habitat. These measures include information from the 2008 Conservation Biology Institute Document "Baseline Evaluation of Fisher Habitat and Population Status and Effects of Fires and Fuels Management on Fishers In the Southern Sierra Nevada, Final Report to USDA Forest Service Pacific Southwest Region" (Spencer et al 2008); "An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests" (North et al 2009); and Sierra Nevada Adaptive Management Study Integration Team discussions, fieldtrips to the project area, as well as Forest Service Standards and Guidelines and Land Allocations stated previously.

- Maintain 50-60% canopy cover immediately post-harvest.
- Thinning will not remove any trees larger than 30-inch dbh (SNFPA ROD S&G # 6).
- Protect all suitable fisher denning habitat with an LOP restricting vegetation treatments from March 1 through June 30. This LOP will protect reproductively active fisher and young that may be present in the project area from treatment actions during their denning and early rearing periods.
- Protect all suitable marten denning habitat with an LOP restricting vegetation treatments from May 1 through July 31. This LOP will protect reproductively active marten and young that may be present in the project area from treatment actions during their denning and early rearing periods.
- Snags will be felled only if they meet the definition of a danger tree (as described in the Engineering Design Criteria), have the potential to fall across prescribed fire control lines, and/or pose a threat to firefighter safety during prescribed fire implementation. Down logs created as a result of snag felling will remain in the stand where needed to meet down log requirements of SNFPA ROD S&G #10. Snags not meeting the criteria of a danger tree will remain as standing snags within the project area.
- Retain dense groups of larger trees (greater than 30-inch dbh) with touching crowns at the rate of approximately one group per 2.5 to 3.5 acres. Ideally these groups would contain "defect" trees, those that have cavity and platform creating defects (mistletoe, rot, fork topped, broken limbs and tops) for pacific fisher denning and resting sites. Within these large tree groups, all trees over 20" dbh will be retained. These large tree groups will generally have a residual basal area of 240 ft^2 or more for mixed conifer and 210 ft^2 or more for pine and in many instances may reach 300 to 400 ft^2 per acre. Retention of these large tree groups with higher basal areas and the inclusion of defect trees are designed to maintain the integrity of suitable fisher denning and resting sites throughout the treatment units. Non-treated areas within proposed treatment units, such as riparian areas and steep slopes, will also provide extensive areas of tree group retention as no

treatments will be occurring in these areas. Large conifer retention groups, combined with non-treatment areas outside of project units will help maintain habitat heterogeneity throughout the treatment units and the project area as a whole.

- Within the Fish Camp Unit T-9, a 5 acre inclusion of decadent, high quality, dense fisher/spotted owl habitat was identified by the marking crew and field verified by the wildlife biologist. A number of predominant trees were noted within this inclusion. Historic aerial photos showed that this inclusion was not previously cut during the extensive railroad logging that occurred in the Sugar Pine and Fish Camp areas throughout the turn of the century. Due to the high habitat value present in this stand, and in accordance with Standard and Guideline #90 from the SNFPA ROD, this unique habitat inclusion was removed from the treatment unit and will not be available for commercial entry.

- To maintain decadent stand characteristics within the treatment units, conifers >16" dbh with structural decadence and/or the potential to become future snags will be identified for retention within the treatment areas. SNFPA ROD S&G #11 provides direction for retention of these structural elements. Within treatment units, conifers with the greatest existing or potential for structural decadence will be retained at an average of 1 every 100 feet. Conifers will be selected using the following characteristics listed in order of priority: evidence of known or potential cavities; broken top; conks or other heart-rot indicators; mistletoe or other abnormal witches broom formation or other diseased or insect damaged trees; teakettle branches; forked top; or broken large branches.

- Black oaks will be retained throughout the project area. Within the treatment areas, conifers will be removed that overtop black oaks 10 inches dbh and larger, or that otherwise restrict sunlight from reaching them (e.g. from the south and west) now or within 15 years following treatment; the amount of conifer removal will be limited by the overall basal area thinning prescription thresholds. Conifer canopy gaps created through this process not only help promote and retain the vigor of black oaks, but also create habitat heterogeneity. Hiding cover around oaks, such as shrubs and small trees will be retained around 2-3 decadent oaks per acre. These oak retention areas will be protected with a buffer area 35 feet from the bole, or to the dripline, whichever is greater, where no thinning or fuels treatments will occur.

- Promote diversity in pine plantation treatment areas larger than 5 acres by creating 1/10 acre openings associated with young black oaks between 4" and 12" dbh, where present, on an average of 1 opening for every 5 acres to encourage diameter growth of the oak through increased sunlight, release the oak from competition, and encourage future stand heterogeneity. To achieve this, Ponderosa and Jeffrey pine trees within pine plantations will be removed from a 180° swath on the Southern aspect around crowded young black oaks for a 50' radius. Species diversity will be increased by selecting vigorous conifer species other than ponderosa and Jeffrey pine for retention during thinning where present. Hardwoods are not planned for removal. (SNFPA ROD S&G #3; #26).

- Shrub and understory diversity will be retained throughout the project area. Understory vegetation will be maintained in Old Forest Linkages associated with riparian areas (cooler, moister sites--RMAs); black oak buffer zones; as well as areas where no treatment will be conducted such as heritage resource sites, botanical areas, slopes >35%, and rocky areas. Tree species associated with riparian areas, such as dogwoods, alders, and willows are not planned for removal. Post sale treatments will retain pockets of understory growth spread throughout the treatment units so that 15-20% of the total

understory growth will be maintained in 1/10 acre pockets within plantation treatment units and ¼ acre pockets within wild stand treatment units. This will preserve stand diversity while decreasing the threat posed by ladder fuels.

- The district biologist will be notified immediately if a nest or den of any TESCP species is discovered within or adjacent to a treatment area so that proper protection measures can be identified and implemented.
- Standards and Guidelines 28 and 29 provide guidance for developing and maintaining adequate habitat connectivity within riparian areas. Recent studies (Spencer 2008; North et al 2009) have also shown that fisher utilize riparian areas as travel corridors between high quality habitat. To provide for this habitat connectivity, design criteria have been developed to incorporate and expand upon established riparian area management zones; i.e. Streamside Management Zones (SMZ) and Riparian Management Areas (RMA) associated with perennial streams (Class I). The forest wildlife biologists have termed these zones Old Forest Linkages (OFL). They incorporate and expand upon the measures required for SMZs and RMAs. OFLs consist of buffers measuring 300 feet total on either side of perennial streams. Design criteria for these Old Forest Linkages are detailed in Table 1 and Figure 1.

Table 1: Riparian Area Management Zones

Distance from Stream*	Vegetation Management Activities Allowed within zone	Zone Designation
0-50 feet	No Activities Allowed	SMZ/RMA/OFL
50-100 feet	No ground disturbing equipment allowed into area (dozers, skidders, etc.) Activities allowed include hand-felling of trees smaller than 12”dbh, pile-burning, and equipment reach-in with boom arm. Canopy cover is to remain ≥60%.	SMZ/RMA/OFL
100-150 feet	Mechanical entry is allowed. Trees ≤12” dbh may be removed for fire and fuels reduction purposes by equipment. Canopy cover is to remain ≥60%.	OFL
150-300 feet	Mechanical entry is allowed. Thinning from below will occur. Canopy cover is to remain ≥60%.	OFL

*Distance from Stream for Activities is measured and applied to each side of the stream from bank-full left and bank-full right.

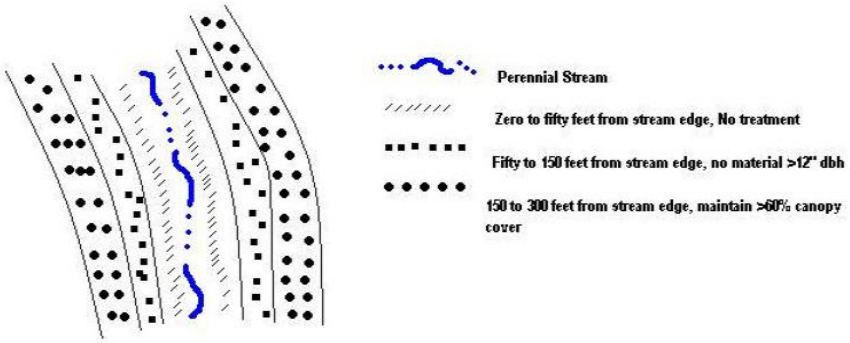


Figure 1: Associated Bounds and Treatments within Old Forest Linkages

Wildlife – Aquatics

Applicable aquatic wildlife species and riparian habitat standards and guidelines are from the 2004 Sierra Nevada Forest Plan Amendment, Final Supplemental Impact Statement and Record of Decision (USDA-FS 2004b) (S&Gs #91-124), the existing Sierra National Forest Land and Resource Management Plan direction (USDA-FS 1992) (S&Gs #66-79), Forest Service handbook (FSH) 2509.22 Sierra Supplement #1 for treatments within Streamside Management Zones (SMZ, USDA 1989), Best Management Practices and other applicable laws and regulations (USDA-FS 2000a). Generalized SMZ designation is outline in Table 2 and mapped in the Project Hydrology Report (Stone 2010).

Table 2. Summary of Relationship between Feature Types, RCA Widths, Stream Classes, SMZ Widths, RMA Widths, and Stream Orders (and other GIS data)

Feature Type	RCA Width	Stream Class	SMZ Width	RMA Width	Corresponding GIS Layer Stream Order
Perennial Streams	300 feet	I	At least 100 ft	100 feet	4+
Seasonally Flowing Streams	150 feet	II	At least 75 ft	N/A	3
		III	At least 50 ft		2
		IV	At least 25 ft		1
		V	None required		-
Streams in Inner Gorge	Top of inner gorge	Varies			
Special Aquatic Features (fens, bogs, springs, seeps, lakes, ponds, wetlands, etc.)	300 feet	N/A	N/A	100 feet	Either identified on GIS layers (meadows, springs, lakes), or identified in the field

Project specific design criteria implementing the above regulation and guidance include:

a) Class I SMZs are within or adjacent to treatment areas: M-09, RX-02, RX-03, RX-04, RX-05, RX-06, RX-09, T-05, T-06, T-08, T-07, T-10, T-14, T-15, T-16, T-17, T-18, T-20, T-22, T-28, T-29, and T-4. Old Forest Linkage Prescriptions apply to these SMZs.

b) Special Aquatic Features: Do not allow mechanical equipment within 100 feet of meadows or other special aquatic features. Includes treatment areas: M-13, M-14, RX-06, T-07, T-10, T-12, T-13, T-14, T-15, T-16, T-17, T-18, T-19, T-20, T-21, T-22, T-27, T-28, T-30, and T-40.

c) Applicable to all SMZs:

   i. Do not allow heavy mechanical equipment within SMZ.

   ii. To protect bank stability, do not cut streambank trees (trees with drip line extending to or over edge of streambank).

   iii. Do not cut any tree located within a channel.

   iv. When lighting piles, start burn from one end only to allow escape route for any species inhabiting piles.

   v. No lighting into SMZs, but fire can creep into zone.

d) For water drafting, use a screened intake device and pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats. A Hydrologist or Aquatic Biologist would approve water-drafting sites. See Best Management Practices (BMP) 2-21 in Appendix B for specific requirements.

e) If newly listed or unknown occurrences of federally listed threatened, endangered, proposed, candidate or Forest Service sensitive aquatic species are found within the affected project area during sale preparation and implementation, additional species protection measures may need to be imposed by the district fisheries and aquatic biologist.

Hydrology

Use all applicable watershed standards and guidelines from the SNFPA ROD (S&Gs #95-124) (USDA-FS 2004b), the existing SNF- LRMP direction (S&Gs #120-131) (USDA-FS 1992), Forest Service handbook (FSH) 2509.22 Sierra Supplement #1 for treatments within Streamside Management Zones (SMZ, USDA 1989), and design measures to protect water quality and ensure watershed health that are detailed by *Water Quality Management for Forest System Lands in California, Best Management Practices* (USDA, 2000).

Project specific implementation of the mentioned S&Gs and policy documents include:

1. Stream Crossings: To minimize the potential for project-related effects on hydrologic connectivity, existing crossings would be used whenever possible. In the event that it is necessary to construct a temporary crossing, the methods used for construction would be selected to avoid or minimize detrimental soil and vegetation disturbance and to maintain hydrologic connectivity between upstream and downstream features (Appendix 2 of hydrology specialist report details a low impact crossing methodology). All temporary crossings would be removed following the completion of project-related activities and would be treated as necessary to restore to pre-project conditions. Implementation of the activity-specific BMP's would further ensure that hydrologic connectivity in streams and special aquatic features are not adversely affected.

2. If treatment of wild/mixed stands or plantations does need to occur within the 100 foot meadow SMZ:

    a. If the slope gradient is less than or equal to 10%, and the soil has a low erosion hazard and low sensitivity, then light-on-the–land equipment can be used to pre-commercially thin within the SMZ provided that:
        i. the equipment minimizes the amount of turning within the SMZ. Where possible, the equipment should reach into the SMZ or roll straight into and out of the SMZ to minimize soil disturbance.

    b. If the slope gradient is greater than 10% and/or the soil has a moderate to high erosion hazard and/or a moderate to high sensitivity, then thinning should be done hand, i.e., trees should be felled by hand, bucked, and left in place or end-lined out of the SMZ.

    c. All ground disturbance that could cause concentrated flow and/or accelerated erosion will be restored to pre-disturbance condition, with interim measures to protect the soil in order to allow at least 50% vegetative ground cover to return (protective measures could include placement of slash, mulch, weed-free straw, waddles, etc.).

3. Treatment units T-16, T-17a-d, T-19a-b, T-22a-c, T-28a-j that are within subwatershed 501.5005 (map 9) and the Long Meadow Creek drainage will require light-on-the-land mechanical treatment or deferral of treatment. Light-on-the land treatment includes: cut-to-length harvest system or whole tree yarding system, grapple piling, or prescribed fire. Deferral of treatment areas includes spacing out disturbance over time to allow initial treated areas to recover (at least three years) before other areas are treated.

    a. Management prescription for Streamside Management Zones (SMZ).
        i. Do not treat vegetation within the SMZs of Class I or II streams in sub-watersheds over the lower threshold of concern (TOC).
        ii. In the outer 50 feet of other SMZs, thin trees to reduce fuel loading by:
            1. Removing ladder fuels (intermediate and suppressed trees)
            2. Removing diseased trees that will fall away from riparian areas, and
            3. Hand-piling slash as necessary to reduce the effects of under burning
            4. maintaining trees with broken tops for source of large woody debris (LWD) recruitment

    b. The hydrologic connectivity of roads:
        i. Spot rocking of roads or out sloping road surfaces to quickly direct runoff from the road surface rather than concentrating flows in an inboard ditch and routing it to the stream channel;
        ii. Installing rolling dips and /or additional relief culverts to minimize the length of road drainage entering stream channels, with outlet treatments to minimize the risk of fill slope erosion; and

iii. Rocking of ditches to reduce flow velocity in the ditch, prevent ditch erosion, and encourage deposition, where other techniques are not feasible.

Silviculture

Based on SNFPA ROD (USDA-FS 2004b) S&Gs for mechanical treatments, as well as design criteria, silvicultural prescriptions will be written utilizing thinning from below techniques with basal area levels for stand species composition (SNF- LRMP S&G 17).

The planning and implementation of all activities shall use integrated pest management (SNF-LRMP S&G #117):

a) An LOP would be imposed in well stocked stands heavy to fir (over 50% fir) where operations could begin August 1st or later when the sap is not running (fir bark is much more easily dislodged when the sap is running than later in the year). The appropriate specialist or representative will determine which stands require an LOP during the thinning layout phase as needed.

b) To minimize the threat of insect attack, all pine logs created as a part of harvest operations will be removed from the sale areas as either logs or biomass material within 6 weeks of creation. Unutilized pine material will not be concentrated but spread to dry quickly or chipped and spread. Pine logs greater than 3 inches in diameter that are created between July 1st and October 15th and left in the stand will not exceed 8 feet in length.

c) Commercial thinning operations taking place before July 1st or after October 15th in pine stands will require additional measures to minimize creation of pine slash concentrations. Additional bucking of slash may be needed to minimize creation of favorable insect breeding habitat. Any pine logs greater than 3 inches in diameter created after October 15th or before July 1st left in the stand should not exceed 4 feet in length. Precommercial thinning of pine stands should not take place before July 1st or after October 30th each year.

d) Where whole tree yarding is utilized, careful consideration must be given to the protection of the residual trees from damage. Rub trees (previously designated for removal) and/or rub logs should be retained where needed to minimize damage. These will then be removed upon completion of yarding. Skid trails should be as straight as possible and approved prior to skidding. Landing size should be kept to a minimum especially in areas where additional trees must be felled to create landings.

e) To minimize landing size, logs/biomass should be removed as quickly as feasible from landings during skidding operations and not allowed to accumulate. During post sale treatments, 15 to 20 percent of the understory growth would be retained within plantations and wildstands in pockets approximately 1/10 acre in size. (When determining understory pockets to be retained, understory pockets around oaks, groupings of larger diameter trees, steep slopes, draws, etc. within treatment units would be included.) Understory pockets would not be retained in locations where they would jeopardize the effectiveness of planned fuels treatments (SNF- LRMP S&G #113 and 114).

Fuels

SNFPA ROD (USDA-FS 2004b) S&G #3 addresses fuels treatments. Project specific S&G #3 implementation criteria include:

a) The utilization of prescribed fire to maintain appropriate levels of surface and ladder fuels to meet fire and fuels objectives will be conducted in prescribed fire treatment areas and portions of T-8b north of road 5S06, T-9, portion of T-10b north of road 5S06 and all except the very east portion of T-12. To reduce the potential impacts (fire effects) that may occur with the implementation of prescribed fire, the following criteria would need to be considered in the areas where prescribed fire would be used:

b) Prescribed fire areas should be considered where there are larger residual trees (of size less susceptible to fire damage) with light fuel loadings, and/or areas where conifer reproduction is not being used for re-generation of openings.

c) Prescribed fire will be conducted as outlined in a burn plan, to minimize effects to trees during active growing period and within Pacific fisher denning habitat areas.

Engineering

a) Maintain all National Forest Transportation System (NFTS) roads to standards established in the Forest Service Handbook 7709.58. Perform road maintenance, reconstruction and new road construction activities to support project access needs. Insure drainage structures are functional and stable to prevent potential resource damage and degradation of water quality (SNF- LRMP S&G #78, #79, #124, #206 and BMPs).

b) Perform a final field review of project roads to determine reconstruction needs prior to project activities. Where economically feasible, place aggregate on existing native surface roads located in areas with High and very High Soil Erosion Hazard ratings (SNF- LRMP S&G #129).

c) Close temporary roads required for unit access upon completion of use; remove all culverts, rip and ditch landings, construct waterbars, block the entrance with a log and dirt berm, and disguise the entrance with brush to discourage additional traffic. (FS Handbook (FS Handbook 2409.15, Sec.51.8)

d) Roadways will be managed for safe passage by road users. This will include the management of hazards associated with roadside vegetation, including the identification and mitigation of danger (hazard) trees. A danger tree, as defined in Forest Service Handbook (FSH) 7709.59, Chapter 40, is a standing tree (live or dead) that presents a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of lean of the tree (FSH 6709.11, Glossary). Selection criteria guidelines for the marking and removal of danger trees will be tiered to the BLRD Hazard Tree Environmental Assessment, (USDA-FS 2006a).

Appendix C – Best Management Practices Specific to Fish Camp Project

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 1-1 Timber Sale Planning Process: To incorporate water quality and hydrologic considerations into the timber sale planning process.	Implemented through the Riparian Conservation Objectives/Forest Plan Consistency report, specification of operational BMPs, Environmental Analysis including interdisciplinary team office and field discussions, and incorporation of water quality protection measures in the Timber Sale Contract for the KRP EIS.
BMP 1-4 Use of Sale Area Maps (SAM) and/or Project Maps for Designating Water Quality Protection Needs: To ensure recognition and protection of areas related to water quality protection delineated on a SAM or project map.	The sale administrator and purchaser will review these areas on the ground prior to commencement of ground disturbing activities. Examples of water quality protection features that will be designated on the project map include: 1) Location of streamcourses and riparian zones to be protected, including the width of the protection zone for each area. 2) Wetlands (meadows, lakes, springs, etc.) and other sensitive areas (such as shallow soils) to be protected. 3) Boundaries of harvest units, specified roads and roads where hauling activities are prohibited or restricted, areas of different skidding and/or yarding methods, including post-harvest fuels treatments, and water sources available for purchaser's use.
BMP 1-5 Limiting the Operating Period of Timber Sale Activities: To ensure that the purchasers conduct their operations, including erosion control work, road maintenance, and so forth, in a timely manner, within the time frame specified in the Timber Sale Contract.	The purchaser's contract operation period will be limited to contract-specified periods when adverse environmental effects are not likely. The Sale Administrator will close down operations due to rainy periods, high water, or other adverse operating conditions in order to protect resources.
BMP 1-8 Streamside Management Zone Designation: To designate a zone along riparian areas, streams and wetlands that will minimize potential for adverse effects from adjacent management activities. Management activities within these zones are designed to improve riparian values.	Streamside management zones (SMZs) have been supplemented with RMAs and RCAs (USDA 2004b) as described in the Design Measures section of the EIS. Within SMZs, the constraints defined in Sierra Supplement No. 1 (USDA Forest Service, 1989) apply. This includes no self-propelled ground based equipment, a minimum groundcover of 50%, and shade canopy may not be modified in a way that affects stream temperature. Modifications to these guidelines are possible where site-specific needs exist if the action is reviewed by a hydrologist or fisheries biologist.
BMP 1-9 Determining Tractor Loggable Ground: To minimize erosion and sedimentation resulting from ground disturbance of tractor logging systems.	Limit ground skidding and machine piling with tractors to slopes less than 35%. Endlining can be used to remove logs from steeper slopes. Ground disturbance on areas of shallow soils, notably soils adjacent and abutting to rock outcrops, will be avoided.
BMP 1-10 Tractor Skidding Design: By designing skidding patterns to best fit the terrain, the volume, velocity, concentration, and direction of runoff water can be controlled in a manner that will minimize erosion and sedimentation.	The sale administrator and purchaser will designate all skid trails prior to ground disturbing activities. If uncertainty arises regarding potential resource impacts of skid trail location, consult with an earth science specialist (i.e., hydrologist, aquatic biologist, or soil scientist).

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 1-12 Log Landing Location: To locate new landings in such a way as to avoid watershed impacts and associated water quality degradation	The following criteria are to be used by the Sale Administrator when evaluating landings: a. The cleared or excavated size of landings will not exceed that needed for safe and efficient skidding and loading operations. Trees considered dangerous will be removed around landings to meet the safety requirements of OSHA. b. Selected landing locations will involve the least amount of excavation and fill possible. Landings must be located outside of SMZs. c. Locate landings near ridges away from headwater swales in areas that will allow skidding without crossing stream channels, violating SMZs, or causing direct deposit of soil and debris to a stream. d. Locate landings where the least number of skid roads will be required, and sidecast can be stabilized without entering drainages or affecting other sensitive areas. Keep the number of skid trails entering a landing to a minimum. e. Position landings such that the skid road approach will be nearly level as feasible, to promote safety and to protect soil from erosion. f. Avoid excessive fills associated with landings constructed on old landslide benches. g. Construct stable landing fills or improve existing landings by using appropriate compaction and drainage specifications. In some cases, using an existing landing located within an RCA or CAR is preferable to constructing a new landing outside of it. These situations will be reviewed on a site-by-site basis by an earth science specialist (aquatics, hydrology, geology, or soils).
BMP 1-13 Erosion Prevention and Control Measures during Timber Sale Operations: To ensure that the purchasers' operations will be conducted reasonably to minimize soil erosion.	Timber purchaser responsibilities for erosion control will be set forth in the Timber Sale Contract. Equipment will not be operated when ground conditions are such that excessive damage will result. The kinds and intensity of control work required of the purchaser will be adjusted by the sale administrator to ground and weather conditions with emphasis on controlling overland runoff, erosion, and sedimentation. Erosion control work required by the contract will be kept current. At certain times of the year this means daily, if precipitation is likely or weekly when precipitation is predicted for the weekend. Erosion prevention measures must be applied no later than October 1 and immediately upon completion of activity begun after November 1. If the purchaser fails to perform seasonal erosion control work prior to any seasonal period of precipitation or runoff, the Forest Service may temporarily assume responsibility, complete the work, and use any unencumbered deposits as payment for the work.
BMP 1-16 Log Landing Erosion Protection and Control: To reduce the impacts of erosion and subsequent sedimentation associated with log landings by use of mitigating measures.	Landings will be properly cross-ditched, ripped (if soils are compacted), re-contoured (as necessary), and mulched after use and before the winter precipitation period, whichever comes first. Excess material not needed for erosion control can be piled and burned. Upon completion of the project, consult with the hydrologist or soil scientist to determine the need for additional soil protection measures.

<table>
<tr><th>BMP Name, Objective, and Direction</th><th>Application to the Fish Camp Project</th></tr>
<tr><td>BMP 1-17 Erosion Control of Skid Trails: To protect water quality by minimizing erosion and sedimentation derived from skid trails.</td><td>Erosion control measures will be installed on all skid trails, tractor roads, and temporary roads. Erosion control measures include, but are not limited to, cross ditches (water bars), organic mulch, and ripping. Cross ditches will be spaced according to the guidelines below, maintained in a functioning condition, and placed in locations where drainage would naturally occur (i.e., swales). The level of maintenance will be contingent upon existing or predicted weather patterns as determined by the Sale Administer (see BMP 1-13).
Minimum Cross Drain Spacing<table><tr><td>% Slope</td><td>Maximum Spacing</td></tr><tr><td>0 - 15</td><td>125 feet</td></tr><tr><td>15 - 35</td><td>45 feet</td></tr></table></td></tr>
<tr><td>BMP 1-18 Meadow Protection during Timber Harvesting: To avoid damage to the ground cover, soil, and hydrologic function of meadows.</td><td>Mechanical equipment is not permitted in meadows unless specifically authorized by an aquatic biologist and hydrologist.</td></tr>
<tr><td>BMP 1-19 Streamcourse and Aquatic Protection: The objectives of this BMP are:
a. To conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values.
b. To provide unobstructed passage of stormflows.
c. To control sediment and other pollutants entering streamcourses.
d. To restore the natural course of any stream as soon as practicable, where diversion of the stream has resulted from timber management activities.</td><td>a. The location and method of crossings on Class IV and V streams must be agreed to by the sale administrator (SA) prior to construction.
b. Stream crossings on Class I – III streams must be approved by the hydrologist and aquatic biologist.
c. Damage to stream banks and channels will be repaired to the extent practicable.
d. All sale-generated debris will be removed from streamcourses, unless otherwise agreed to by the SA, and in an agreed upon manner that will cause the least disturbance.
e. Felled trees will not be pulled across perennial or intermittent stream channels without prior approval by the hydrologist or aquatic biologist.
f. Methods for protecting water quality while utilizing tractor skid trail design in stream course areas where harvest is approved include: (1) end lining, (2) falling to the lead, and (3) utilizing specialized equipment with low ground pressure such as feller buncher harvester.
g. Water bars or other erosion control structures will be located so as to disperse concentrated flows and filter out suspended sediments prior to entry into streamcourse.
h. Material from temporary road construction and skid trail streamcourse crossings will be removed and streambanks restored to the extent practicable.
i. Special slash treatment site preparation activities will be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment.
j. Project-related bare soil areas (e.g. skid trails, landings, temporary roads, etc.) will be covered with existing native vegetation mulch, organic debris, or certified weed free straw to at least 50%, well distributed cover, and cross-ditched per BMP 1-17 requirements.</td></tr>
</table>

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 1-20 Erosion Control Structure Maintenance: To ensure that constructed erosion control structures are stabilized and working	During the period of the timber sale contract, the purchaser will provide maintenance of soil erosion control structures contracted by the purchaser until they become stabilized, but not more than one year after their construction. If the purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the purchaser accordingly. The Forest Service sale administrator is responsible for ensuring erosion control maintenance work is completed.
BMP 1-21 Acceptance of Timber Sale Erosion Control Measures before Sale Closure: To ensure the adequacy of required erosion control work on timber sales.	The sale administrator must inspect erosion control measures to ensure their adequacy prior to accepting closure on the unit and/or sale. The effectiveness of erosion control measures will be evaluated using BMPEP protocols (see Monitoring Plan) after the sale area has been through one or more wet seasons. This evaluation is to ensure that erosion control treatments are in good repair and functioning as designed before releasing the purchaser from contract responsibility. The purchaser is responsible for repairing erosion control treatments that fail to meet criteria in the Timber Sale Contract, as determined by the Sale Administer, for up to one year past closure of the sale.
BMP 1-22 Slash Treatment in Sensitive Areas: To maintain or improve water quality by protecting sensitive areas from degradation which would likely result from using mechanized equipment for slash disposal.	All burn piles made with mechanical equipment must be located outside of the SMZ. Hand piles will be kept at least 20 feet away from all streams, meadows, springs, seeps, and other sensitive aquatic areas.
BMP 2-1 General guidelines for the Location and Design of Roads: To locate and design roads with minimal resource damage.	The following considerations are incorporated into the planning process of road location and design. These measures are preventative, apply to all transportation activities, and indirectly protect water quality: (a)Transportation facilities will be developed and operated to best meet the resource management objectives with the least adverse effect on environmental values. (b)The location, design, and construction of roads will include the use of the IDT. (c)Sensitive areas such as wetlands, inner gorges, and unstable ground will be avoided to the extent practicable. (d)Stream crossings will be designed to provide the most cost efficient drainage facility consistent with resource protection, facility needs, and legal obligations.
BMP 2-2 Erosion Control Plan: To mitigate and control erosion through effective planning prior to initiation of construction.	Any new construction would be subject to erosion control measures as per an IDT approved plan that may include but not be limited to waterbar installation, sediment fencing, culvert installation and armoring, placement of straw waddles, approved straw cover and/or slash and any other method necessary to mitigate erosion and sediment routing in the project subwatershed(s).
BMP 2-3 Timing of Construction Activities: To minimize erosion by conducting operations during minimal runoff periods and when soils are dry and less prone to compaction.	Ground-disturbing activities will occur when soils are dry. In some cases soils may never dry sufficiently. Ground-disturbing work that occurs off of existing roads will occur during the dry season and will reduce ground disturbance as much as possible.
BMP 2-5 Road Slope Stabilization Construction Practices: To reduce sedimentation by minimizing erosion from road slopes and slope failure along roads.	An adequate soils and geologic investigation will be conducted when finalizing new road construction designs for: correct cut and fill steepness based on the angle of repose for the type of material; methods to handle surface runoff; and necessary compaction standards and surfacing needs.

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 2-7 Control of Road Drainage: To minimize the erosive effects of water concentrated on roads, to disperse runoff from road surfaces, to lessen sediment yield from roaded areas, and to minimize erosion of the road prism.	Newly constructed or reconstructed roads will be designed to reduce hydrologic connectivity and soil erosion wherever feasible. The sale administrator or other Forest Service representative will ensure that roads are adequately maintained during project implementation to ensure that road drainage features function as designed.
BMP 2-8 Constraints Related to Pioneer Road Construction: To minimize sediment production and mass wasting from pioneer road construction.	(a)Roads will be constructed within the planned roadway limits unless otherwise specified or approved by the ER or COR. (b)Pioneer roads will be located to prevent undercutting of the designated final cut slope, avoid deposition of materials outside the designated roadway limits, and accommodate drainage with temporary culverts or log crossings. (c)Erosion control work will be completed prior to the rainy season and in accordance with the contract. (d) Crossing sites on live streams will be dewatered during construction with diversion devices (see BMP 2-15).
BMP 2-9 Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects: To minimize erosion and sedimentation from disturbed ground on incomplete projects.	Erosion control must be completed before the rainy season (usually October in the KRP project area). Preventative measures for timely erosion control include: (a)Removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossings. (b)Installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion. (c)Removal of debris, obstructions, and spoil material from channels and floodplains. (d) Planting vegetation, mulching, and/or covering exposed surfaces with jute mates or other protective material.
BMP 2-10 Construction of Stable Embankments: To construct embankments with materials and methods which minimize the possibility of failure and subsequent water quality degradation.	Roadways will be designed and constructed as stable and durable earthwork structures with adequate strength to support the treadway, shoulders, subgrade and road traffic loads.
BMP 2-11 Control of Sidecast Material During Construction and Maintenance: To minimize sediment production originating from sidecast material during road construction or maintenance.	Sidecasting is not permitted within SMZs. Waste areas must be located where excess material can be deposited and stabilized.
BMP 2-12 Servicing and refueling equipment: To prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels.	Storage of hazardous materials (including fuels) and servicing and refueling of equipment will be conducted at pre-designated locations outside of RCAs and CARs. If fueling and/or storage of hazardous materials are needed within RCAs or CARs, those sites must be reviewed and approved by the District Hydrologist or Aquatic Biologist. Additional protection measures, such as containment devices, may be necessary.
BMP 2-13 Control of Construction and Maintenance Activities Adjacent to SMZs: To protect water quality by controlling construction and maintenance actions within and adjacent to SMZs so that SMZ functions are not impaired.	Construction and maintenance fills, sidecast, and end-hauled materials will be kept out of SMZs except at designated crossing sites to minimize the effect to the aquatic environment.

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 2-14 Controlling In-Channel Excavation: To minimize stream channel disturbances and related sediment production.	There will be no in-channel or streambank excavation during any phase of project activities unless authorized by the district hydrologist or aquatic biologist.
BMP 2-16 Stream Crossings on Temporary Roads and Skid Trails:	Mechanical equipment crossing of perennial and intermittent (generally class I – III) streams is not permitted unless approved by the district hydrologist or aquatic biologist. Ephemeral streams (stream class IV and V) may be crossed at designated locations as agreed upon by the sale administrator and purchaser. Designate skid trails to avoid stream crossings and SMZs wherever possible. Designated crossings must be as perpendicular to the channel as possible and avoid sensitive soils and riparian vegetation damage. Stream banks must be repaired upon completion of the project.
BMP 2-19 Disposal of Right-of-Way and Roadside Debris: To ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed.	If slash generated by road work is disposed of within SMZs, it will be piled and burned or chipped. Material may also be removed from the SMZ for disposal.
BMP 2-21 Water Source Development Consistent with Water Quality Protection: To supply water for roads and fire protection while maintaining existing water quality.	Water drafting will not occur in streams when the base discharge is less than 1.5 cfs, and will not draft more than 50% of the ambient discharge over 1.5 cfs. New drafting sites shall be approved by the District Hydrologist or Fisheries/Aquatic Biologist and located to minimize sediment and maintain riparian resources, channel condition, meadow integrity, and aquatic species viability and habitat. Approaches will be as near perpendicular to the stream as possible and will be gravel surfaced or otherwise stabilized. If water-drafting is required, pumps with low entry velocity and suction strainers with screens less than 2 mm in size (1/8 in.) will be used.
BMP 2-22 Maintenance of Roads: To maintain roads in a manner that provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities, all of which can cause erosion, sedimentation, and deteriorating watershed conditions.	Roads needed for project activities will be brought to current engineering standards of alignment, drainage, and grade before use, and will be maintained through the life of the project. Roads will be inspected at least annually to determine what work, if any, is needed to keep ditches, culverts, and other drainage facilities functional and the road stable.
BMP 2-23 Road Surface Treatment to Prevent Loss of Materials:	Surface stabilization will be considered where grades exceed 12% or road is within riparian conservation areas.
BMP 2-24 Traffic Control During Wet Periods: To reduce road surface disturbance and the rutting of roads, and to minimize sediment washing from disturbed road surfaces.	On roads not designated for all weather or winter haul, heavy equipment operations will be limited until the period after the soil has dried in the top 12 inches in the spring.
BMP 2-26 Obliteration or Decommissioning of Roads: To reduce sediment generated from temporary roads, unneeded system and non-system roads by obliterating or decommissioning them at the completion of the intended use.	Temporary roads will be obliterated after serving their intended purpose for this project. This includes: (1) road effectively barricaded; (2) road effectively drained by measures such as re-contouring or outsloping to return surface to near natural hydrologic function; (3) a well distributed mulch or organic cover provides at least 50% cover, or road surface is revegetated using local native species; (4) sideslopes are reshaped and stabilized to match the natural contour (as necessary); and (5) stream crossings are removed and natural channel geometry is restored. If non-local mulch is used (such as straw), it must be approved by the Forest Service as weed free.

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 5-8 Pesticide Application According to Label Directions and Applicable Legal Requirements: To avoid water contamination by complying with all label instructions and restrictions for use.	This BMP requires glyphosate applicators to strictly adhere to pesticide label instructions.
BMP 5-11 Cleaning and Disposal of Pesticide Containers and Equipment: To prevent water contamination resulting from cleaning or disposal of pesticide containers.	The cleaning and disposal of glyphosate containers will be done in accordance with Federal, State, and local laws, regulations and directives.
BMP 5-12 Streamside Wet Area Protection During Pesticide Spraying: To minimize the risk of pesticide inadvertently entering waters, or unintentionally altering the riparian area, SMZ, or wetland.	When spraying glyphosate, an untreated strip of land and vegetation will be left alongside surface waters, wetlands, riparian areas, or SMZ. Strip widths established by the IDT are 5 feet for dry channels and 25 feet for flowing channels (see Herbicide Use design criteria).
BMP 6-1 Fire and Fuel Management Activities: To reduce public and private losses and environmental impacts which result from wildfires and/or subsequent flooding and erosion by reducing or managing the frequency, intensity and extent of wildfire.	The project action alternatives are designed to achieve the desired conditions of BMP 6-1.
BMP 6-2 Consideration of Water Quality in Formulating Fire Prescriptions: To provide for water quality protection while achieving the management objectives through the use of prescribed fire.	Prescribed burning is planned at the minimum intensity and severity necessary to achieve management objectives, and each Burn Plan will incorporate all relevant design measures from this EIS.
BMP 6-3 Protection of Water Quality from Prescribed fire Effects: To maintain soil productivity, minimize erosion, and minimize ash, sediment, nutrients, and debris from entering water bodies.	Fires will be allowed to back into riparian vegetation, but direct lighting within riparian vegetation will not occur. All fire lines within RCAs and CARs will be water barred per BMP 1-17 spacing requirements. Fire lines within RCA (i.e., 150 ft., seasonal streams, and 300 ft. perennial streams, springs, and meadows) will be designed and constructed to reduce sediment entry into channels. Fire lines in RCAs will cross perpendicular to streams and follow the natural landscape contour as much as possible. Firelines within the SMZ will be hand cut. Waterbars will be placed on either side of each stream crossing to prevent or reduce sediment entry into streams.
BMP 6-5 Repair or Stabilization of Fire Suppression Related Watershed Damage: To stabilize all areas that have had their erosion potential significantly increased, or their drainage pattern altered by suppression related activities.	In the event of a wildfire, protection of resources would be evaluated under the Burned Area Emergency Response, assessment and treatment Implementation protocol.

BMP Name, Objective, and Direction	Application to the Fish Camp Project
BMP 6-6 Emergency Rehabilitation of Watersheds Following Wildfires: To minimize as far as practicable: 1.) loss of soil and onsite productivity; 2.) overland flow, channel obstruction and instability; 3.) threats to life and property both on-site and off-site	In the event of a wildfire, protection of resources would be evaluated under the Burned Area Emergency Response, assessment and treatment Implementation protocol..
BMP 7-3 Protection of Wetlands: To avoid adverse water quality impacts associated with destruction, disturbance, or modification of wetlands.	Ground disturbing activities will not occur in wetlands or meadows.
BMP 7-4 Oil and Hazardous Substance Spill Contingency Plan and Spill Prevention Containment and Countermeasure (SPCC) Plan: To prevent contamination of water from accidental spills.	A spill contingency plan and spill prevention and countermeasure plan (SPCC) must be prepared if hazardous materials (including fuels and oils) stored on the Sierra National Forest exceed 1320 gallons, or if a single container exceeds 660 gallons. The plan will at a minimum include: the types and amounts of hazardous materials located in the project area, pre-project identified locations for hazardous materials storage and fueling/maintenance activities (must be located outside of RCA and CAR unless prior approval by District Hydrologist or Aquatic Biologist is obtained), methods for containment of hazardous materials and contents of on-site emergency spill kit, and a contingency plan (including contact names with phone numbers) to implement in the event of a spill. The SPCC plan must be approved by the Forest Service prior to project implementation.

Appendix D Monitoring Plan

IMPLEMENTATION MONITORING

Implementation monitoring includes a combination of administrative controls on project preparation, review of completed plans, and inspections during operation to ensure that project activities are accomplished consistent with any decision associated with this analysis. Administrative controls include having qualified staff prepare contracts and plans to implement the actions. Those plans are reviewed by higher level staff or Line Officers to ensure the plans include required resource protections measures. Project implementation is overseen by qualified staff with the delegated authority to make sure the project is implemented according to the approved plans, and to take corrective action during project implementation if actions are not in compliance with the approved plans.

EFFECTIVENESS MONITORING

Effectiveness monitoring includes site review after treatments to determine if the required measures achieved the intended results. Examples include post burn surveys to determine if adequate ground cover remains after treatment. The protocols associated with the Best Management Practices Evaluation Program (BMPEP) will be applied concurrently with treatments to provide "real time" monitoring of the effectiveness of water quality protection measures.

Monitoring of the conditions following initial prescribed fire treatments will be done to determine if additional treatments are needed to meet fire and fuels objectives. Particular attention would be given to those treatment areas associated with SPLAT's and DFPZ's surrounding the community of Fish Camp, as these are the priority areas within the project for follow-up treatments to reduce surface fuels, if needed.

As stated in the SNFPA ROD 2004, treatments are to be designed and effective for at least 10 years before re-entry is needed. With the implementation of the Fish Camp Project, there is a potential to return fire (in the form of prescribed fire) back into a fire dependent ecosystem. Existing conditions do not allow the opportunity, without some form of mechanical treatment to reduce surface and ladder fuels, to do this in a controlled manner without detrimental fire effects. Potential exist where prescribed fire can and would be utilized as maintenance for the proposed treatments.

As part of prescribed fire implementation air quality monitoring will be required by burn bosses to make observations on a regular basis of the smoke conditions that are being created to make sure they are following the smoke plan direction. These include the travel direction and dispersion quality of smoke such as smoke settling into smoke sensitive areas and continued or potential for visibility degradation especially across main travel routes. When possible, lighting techniques and/or burn operations are changed to minimize the continuance of these impacts.

Appendix E – Stand by Stand Treatment Table

Commercial Thinning by Stand (Referred to as "Tractor" in Treatment Map in Appendix F)

NEPA Unit "T" Units	Estimated Acres	Unit Type	Alternative 2 Treatment	Logging System	Estimated Acres Clean/Thin/ Tractor Pile & Burn	Estimated Acres Mastication	Estimated Acres Prescribed Fire (Understory Burning)*
5	11	Plantation	Commercial Thin	Tractor	5	0	0
6	2	Plantation	Commercial Thin	Tractor	0	0	0
7a-b	86	Wild	Commercial Thin	Tractor	50	0	0
8	55	Wild	Commercial Thin	Tractor	35	0	34
9	144	Wild	Commercial Thin	Tractor	60	0	134
10a-d	75	Plantation	Commercial Thin	Tractor	15	30	10
12	30	Wild	Commercial Thin	Tractor	20	0	30
13	41	Wild	Commercial Thin	Tractor	25	0	0
14	10	Plantation	Commercial Thin	Tractor	5	0	0
16	60	Plantation	Commercial Thin	Tractor	25	15	0
17a-d	40	Plt 17 /Wild 23	Commercial Thin	Tractor	10	15	0
18a-d	91	Wild	Commercial Thin	Tractor	45	25	0
19a-b	26	Plt 14 /Wild 12	Commercial Thin	Tractor	8	15	0

NEPA Unit "T" Units	Estimated Acres	Unit Type	Alternative 2 Treatment	Logging System	Estimated Acres Clean/Thin/ Tractor Pile & Burn	Estimated Acres Mastication	Estimated Acres Prescribed Fire (Understory Burning)*
20a-b	44	Plt 3 /Wild 41	Commercial Thin	Tractor	24	0	0
21a-d	52	Plt 29 /Wild 23	Commercial Thin	Tractor	15	15	0
22a-c	64	Plantation	Commercial Thin	Tractor	20	15	0
27	1	Wild	Commercial Thin	Tractor	1	0	0
28a-j	134	Plt 119 /Wild 15	Commercial Thin	Tractor	30	30	0
Total	966				393	160	208

* Slash concentrations will have been spot piled and burned in majority of underburning areas within thinned areas prior to underburn.

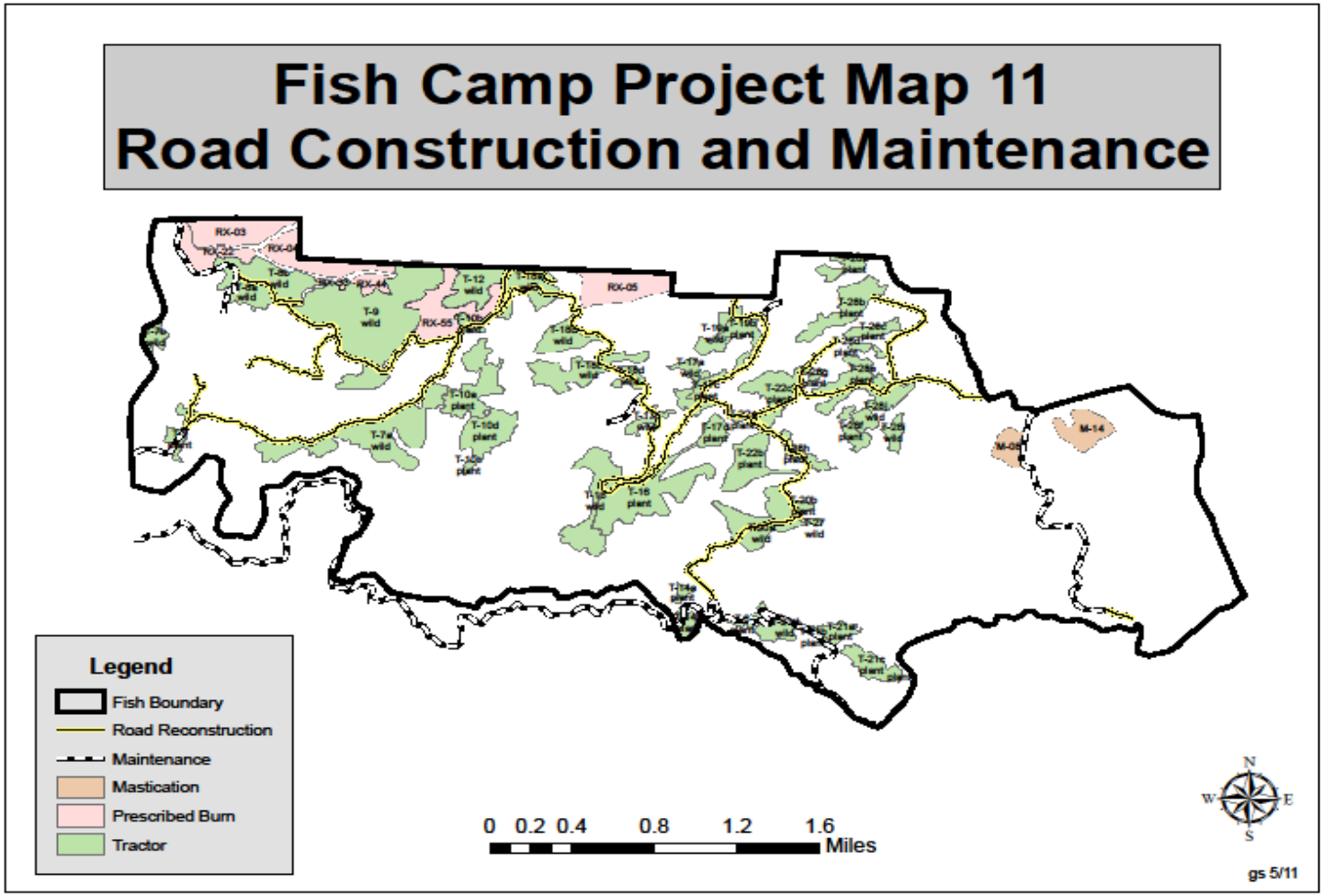
Mastication by Stand

M Analysis Area number "M" Units	NEPA Analysis Acres	Thin/Release Mastication acres	Comments
8	15	15	1991 Plantation
14	26	26	1994 Plantation
	41	41	

Prescribed Burning by Stand

Rx Analysis Area Number "Rx" Units	NEPA Analysis Acres	Underburn acres	Comments
3	37	37	
4	32	32	
5	42	42	
22	23	23	
33	2	2	
44	9	9	
55	48	48	plantation recently masticated
	193	193	

Appendix F


Fish Camp Project Map 11
Road Construction and Maintenance
Legend
Fish Boundary
Road Reconstruction
Maintenance
Mastication
Prescribed Burn
Tractor
0 0.2 0.4 0.8 1.2 1.6
Miles
N
W
E
S
gs 5/11

Alternative G – Stand Tables

Fish Camp Plot Data Summary

Existing and Proposed Action Conditions

Location	Species Composition						Age	Site	Trees 5" dbh & larger						Basal Area 5" & larger					Crown Closure		Mean Dia	Leave Mean Dia	No. Plots
	PP	SP	WF	RF	IC	OK			Total	Cut 5-10	Cut 11-20	Cut 21-29	Lv 21-29	Tot Lv	Total	Cut 5-20	Cut 21-29	Lv 21-29	Tot Lv	Before	After			
Plantations																								
5,6,10 &14	100	0	0	0	0	0	45	1	197	18	93	3	7	81	260	110	10	10	140	95 (D)	65 (D)	15.6	17.5	2
10&28 light	86	0	7	0	7	0	45	1	82	0	15	0	14	67	140	20	0	40	120	56 (M)	50 (M)	17.7	18.0	7
16,20 &28	100	0	0	0	0	0	45	1	200	24	81	2	4	93	240	95	5	10	140	95 (D)	65 (D)	15	16.5	4
28 mod	98	0	0	0	2	0	45	1	128	9	43	0	5	76	180	60	0	17	120	59 (M)	50 (M)	16	17.0	4
19&22	97	1	0	0	2	0	50	1	219	13	120	3	11	83	286	137	9	31	140	95 (D)	65 (D)	15.5	17.5	7
21	96	0	4	0	0	0	45	1	165	18	91	0	31	55	260	120	0	90	140	95 (D)	65 (D)	17	21.5	2
Wild Stands																								
7&8 (PP/MC)	12	48	27	0	12	0	104	1	263	38	29	2	31	116	248	45	7	143	188	79 (D)	60 (D)	13.1	17.0	4
7&9 light(PP	11	28	50	0	11	0	10	1	62	0	0	0	40	62	180	0	0	160	180	46	46	23	23.0	3

Loca-tion	Species Composition						Age	Site	Trees 5" dbh & larger						Basal Area 5" & larger					Crown Closure		Mean	Leave Mean Dia	No.
	PP	SP	WF	RF	IC	OK			Total	Cut 5-10	Cut 11-20	Cut 21-29	Lv 21-29	Tot Lv	Total	Cut 5-20	Cut 21-29	Lv 21-29	Tot Lv	Be-fore	After	Dia	Dia	Plots
/MC)							4													(M)	(M)			
9(PP/MC)&13	11	44	28	0	17	0	95	1	105	0	22	10	24	73	270	30	30	90	210	70 (D)	60 (D)	21.7	23.0	2
12 (PP/MC)	29	12	18	0	41	0	79	1	104	0	24	4	39	76	255	30	15	150	210	65 (D)	52 (M)	21.1	24.0	2
17 &19 (MC)	3	9	43	0	46	0	103	1	249	73	52	13	30	111	350	80	50	170	220	86 (D)	60 (D)	13.3	18.5	3
18 (MC)	2	13	40	0	46	0	97	1	171	58	39	24	39	50	360	67	90	173	203	78 (D)	60 (D)	19.7	27.0	4
40&41 (WF)	8	0	92	0	0	0	83	1	167	34	65	7	54	61	360	105	30	210	225	77 (D)	60 (D)	19.9	26.0	2

Note: The data displayed above represents the majority of the vegetation present within a particular treatment area. Due to variability of the vegetation present, other aggregations are also present within treatment areas. Refer to the description and legend pages for more detailed explainations. (A number of aggregations combine to form a stand.)

The plot data and summaries shown provide insight into the variability of the vegetation present within the proposed treatment areas. During collection of the plot data, trees that might be selected for removal under the proposed thinning prescription for that species composition were noted. From that data, potential leave and cut basal area, leave and cut tree sizes and numbers and existing and post harvest crown closures were determined. On a number of plots, for various reasons, leave basal area exceeds targets for that species composition.

Legend for Sugar Pine Plot Data Summary Tables

Location

Number Corresponds to the Treatment Area Number on Project Map

(MC) represents an area that is considered a Mixed Conifer dominated stand

(plt) represents a pine plantation

(WF) represents an area that is considered a White Fir dominated stand

(PP) Pine dominated stands

Species Composition

PP – Ponderosa Pine

SP – Sugar Pine

WF – White Fir

RF – Red Fir

IC – Incense Cedar

Crown Closure

Given in percent (reduced for crown overlap). CWHR relationship for crown closure designation.

P: 25-39%

M: 40-59%

D: 60% +

Desired leave Basal Area for comparison

Pine dominated stands = 150-180 ft^2 per acre

Mixed Conifer (MC) dominated stands = 210 ft^2 per acre

White Fir (WF) dominated stands = 240 ft^2 per acre

Pine plantations = 120-140 ft^2 per acre

Age

Calculated from one sampled tree per plot. The majority of the conifers within the proposed treatment area are 90-110 years old.

Mean Diameter (Dia)
Calculated from trees within plots

CWHR Mapped Polygons vs. CWHR Table of Acres: Polygons on the CWHR map shows the generalized location of CWHR vegetation types found in the project area based on Geographic Information System vegetation mapping. Due to the high degree of variability in stand structure within the project area and the existence of aggregations within stands, further refinement of the CWHR vegetation typing was conducted through aerial photo interpretation and field verification by the District Silviculturist/Wildlife Biologist to develop CWHR Table of acres. This refinement may show increases or decreases in total acreage amounts from what is displayed in the map polygons for particular CWHR types.

Legend for CWHR Map and Table:
All CWHR size classes and canopy closures are included unless otherwise specified.

D.B.H. = Diameter at breast height (consider 4.5 feet from the ground).
Tree size classes:

1 Seedling (<1" dbh)
2 Sapling (1"-5.9" dbh)
3 Pole (6"-10.9" dbh)
4 Small tree (11"-23.9" dbh)
5 Medium/Large tree (≥24" dbh)
6 Multi-layered Tree [In Ponderosa Pine and Sierra Mixed Conifer]

(From Mayer and Laudenslayer, 1988)

Canopy Closure classifications:
S = Sparse Cover (10-24% canopy closure)
P = Open cover (25-39% canopy closure)
M= Moderate cover (40-59% canopy closure)
D = Dense cover (60-100% canopy closure)

Existing and Proposed Action Conditions

The Fish Camp plot data summary table displays plot data collected within the proposed treatment areas displayed on the Fish Camp EIS map. Variable plots were taken using a 30 Basal Area Factor prism for wild stands and 20 Basal Area Factor prism for plantations. Trees less than 5 inches dbh were not sampled. Due to the wide variability of vegetation present within these proposed treatment areas and the project as a whole, plots representing similar stand conditions were grouped together by proposed treatment area. It would be misleading to display an average for the project area. The column labeled "No. Plots" displays the number of plots within each grouping. Although plots were taken within specific potential treatment areas, similar stand conditions may be present in other areas as well. Plot conditions varied widely from a basal area low of 90 ft2 to 450 ft2 per acre. Plot data recorded variations in trees 5 inches dbh and larger per

acre from 15 to hundreds. In some plots no small trees were captured in the sample while in others hundreds per acre were. Several plots represent "groupings of conifers with increased BA retention (20-30" dbh)" similar to those retained in the Cedar Valley and Sugar Pine project areas.

The term "light" which accompanies some of the proposed treatment areas refers to those areas/plots where the basal area present is generally light and would result in minimal removal of trees 10 inches dbh and larger. Although an area may be designated as "light" due to lighter basal areas present, there may still be a need to treat heavily stocked pockets of smaller diameter trees (less than 5 inches dbh) that may not have been sampled during the sampling process. One grouping of plantation aggregations of moderate stocking has been termed "mod".

The majority of the Fish Camp Project area was heavily railroad logged between 1918 and 1924. Logs were processed at the mill at Sugar Pine. The 1944 aerial photos provide a graphic display of the extent of that activity. In some areas scattered older trees were left following logging. The vast majority of conifers present today were seedlings and saplings present in the understory that survived the logging entry. Numerous pine plantations are present within the project area. Over 950 acres were planted between 1959 and 1970 during a concerted effort to reforest previously railroad clearcut lands that had turned into large brushfields. More than 250 acres of additional pine plantations were created during the early 1980s. Wild stands proposed for treatment average 90 to 110 years of age. Overall average site quality sampled is a Dunning 1.

Plot data indicates that wild stands proposed for thinning consist mostly of pine and mixed conifer cover. Stands heavy to white fir are found in only a few small areas. Since these stands originated from advance reproduction present in the understory during the railroad logging era, they are heavy to shade tolerant, more fire prone, species of incense cedar and white fir. Crown closures present were taken from the data sheets with a reduction made for crown overlap. A small portion of the suppressed tree canopy cover was included as part of the existing crown closure.

The mean diameter shown for these plots was taken from FIA data runs utilizing the plot data collected. The leave mean diameter was taken from the projected leave basal area and projected number of leave trees per acre. Since this data is a representative sample of aggregations found in the stands, it is not intended to imply that any particular unit averages a particular diameter. As can be seen from the data sampled, the average diameter following treatment will be larger than before due to the removal of many small trees per acre across treatment units.